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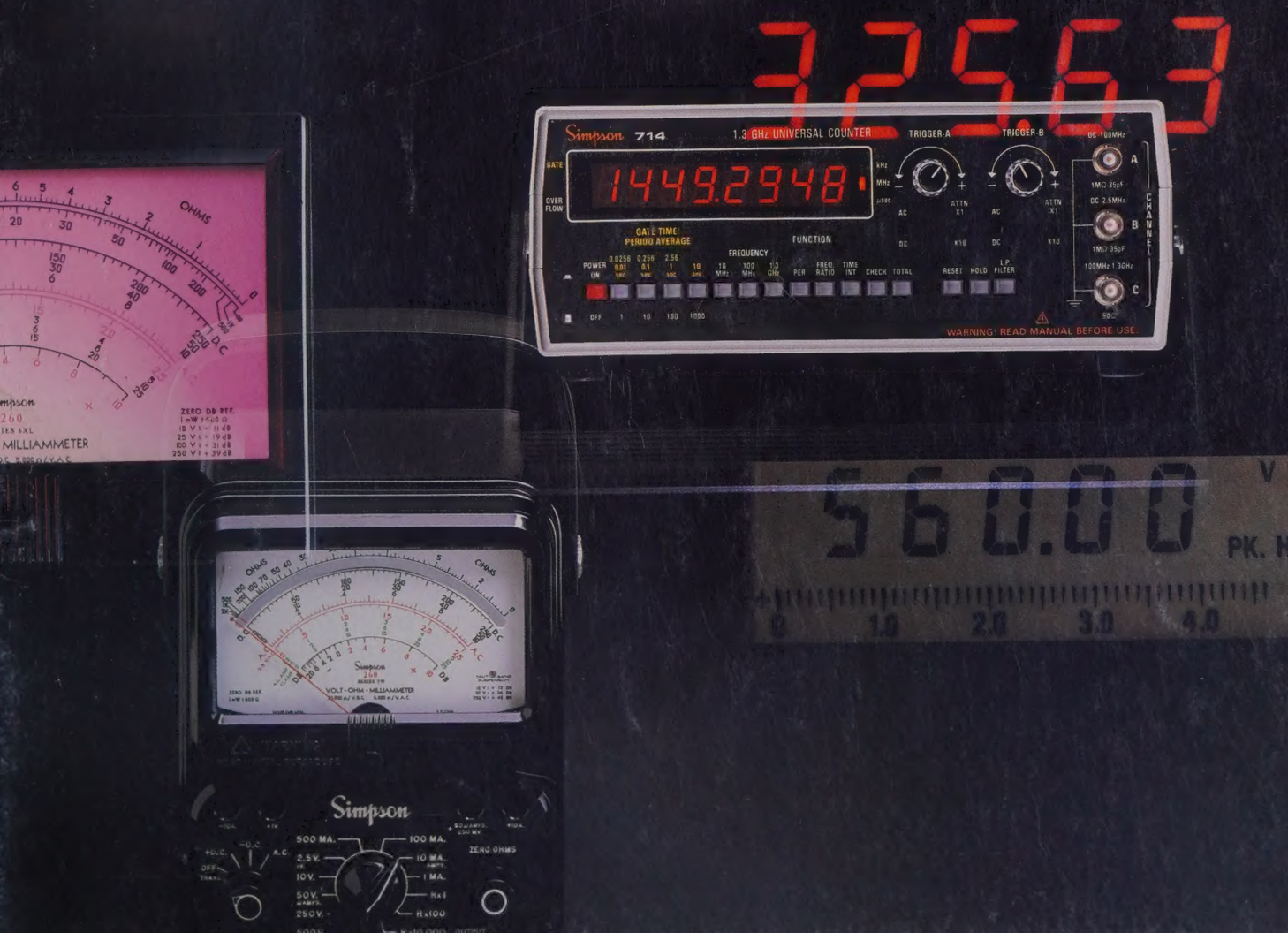
DIGITAL & ANALOG

TEST INSTRUMENTATION



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Instrumentation For Professionals

For over fifty years Simpson has produced electronic instrumentation world renowned for reliability and quality. With over 2000 panel meter designs and nearly 100 different test and measurement instruments, Simpson offers the most complete range of products in the industry. It is Simpson's commitment to provide professional engineers and technicians with accurate, time-proven designs able to withstand tough day-to-day usage, both in the lab and in the field.

Reliability & Quality

Simpson instruments are designed and built to take it, year after year, job after job. Built-in overload protection, high quality components, and rugged construction ensure that every instrument will deliver the maximum useful life with the minimum time spent for calibration or repair. During assembly, multiple inspections make sure that each component meets its design requirement and that every specification is achieved. Circuit boards, loaded with their components, are exercised on automatic test equipment to locate subtle defects which could later jeopardize measurement performance. Every digital instrument is subjected to an elevated temperature burn-in period before final inspection. During final inspection every instrument receives one last check of ranges and functions before shipment.

Tested Safety

Simpson offers more equipment which is safety tested and approved by Underwriters Laboratory than any other manufacturer. And only Simpson offers such a wide range of UL Recognized probes, test leads, and clamp-on ammeters. UL listings are assurance that safety is our number one consideration.

Easy Availability

Simpson instruments are stocked worldwide by a network of leading electrical/electronics distributors. Delivery is usually off the shelf. Service, if necessary, is provided by authorized service centers conveniently located in your area. We know that you have a job to do and we make it as easy as possible for you to get the tools you need.

Ordering Information

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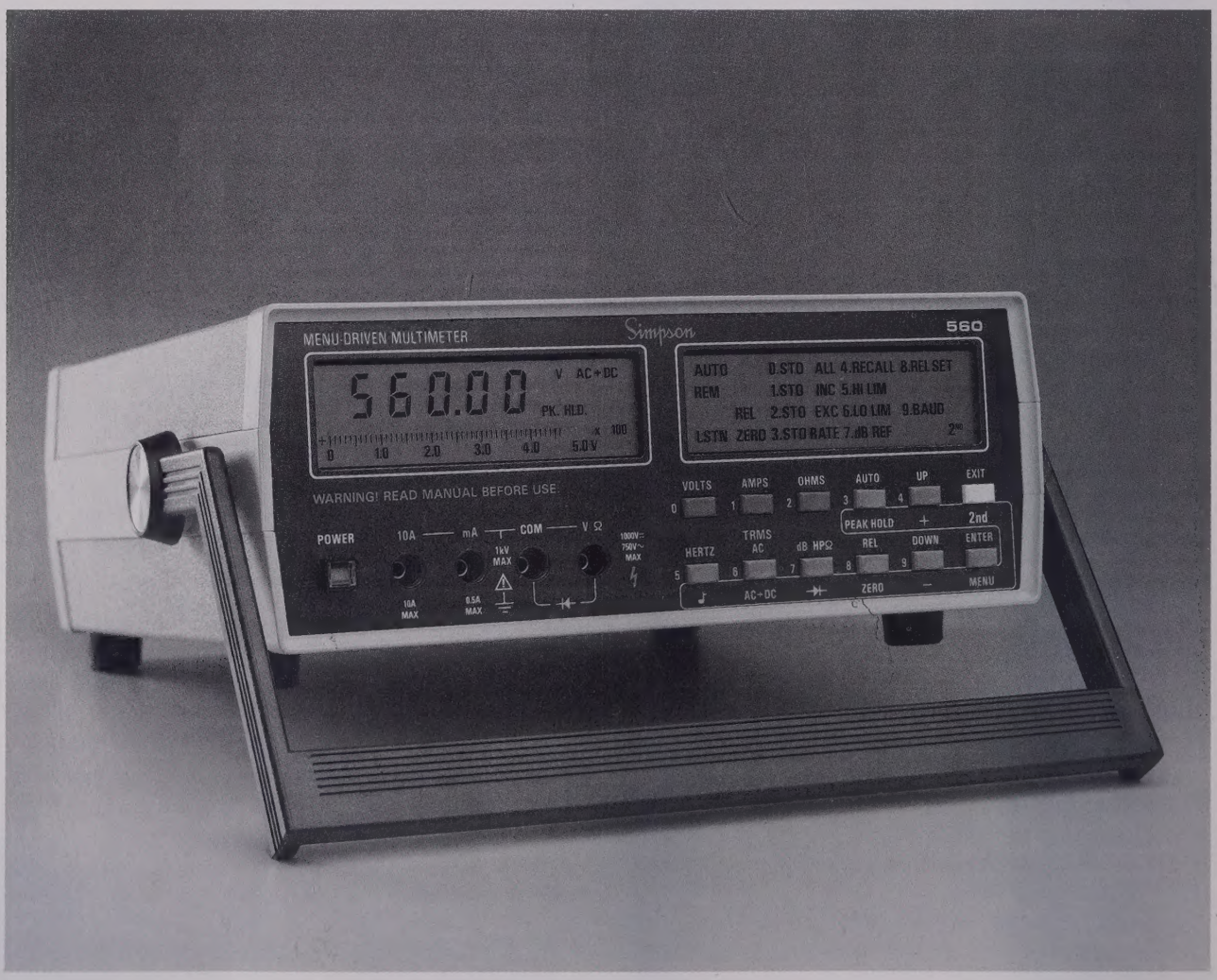
Digital Multimeters

560

Whether you are involved in electronic design, testing, or service, the Model 560's built-in ability to remember test results and compare previous standards to the latest measurements can speed the trouble-shooting process. AC diagnosis functions such as MIN/MAX Hold and Peak Hold quickly give you the answers you need. Spanning the range from 10μV to 750Vrms, the 560 has applications as diverse as transducer measurements and high voltage work. Selection of the low power feature on resistance ranges reduces test currents by a factor of ten, protecting the most sensitive components. True RMS readings of AC signals give you a high level of accuracy — even for non-sinusoidal inputs. The 560's ultra-fast autoranging, simple menu operation, and fast, audible continuity checking live up to Simpson's reputation for ease of use and practicality. Features such as the built-in 500KHz frequency counter, data logging (2,150 readings), and the isolated computer/printer interfaces make the 560 the first in a new catagory of advanced instrumentation.

- ❑ Onboard Memory
  Reference Readings
  Hi/Lo Limits
  Data Logging
  Battery Backup
- ❑ High Visibility, Dual LCD's
  52,000 Counts Plus Annunciators (5 Full Digits)
  52 Segment Bar Graph
  Menu Programming
- ❑ Ultra-fast Autoranging
- ❑ Frequency Counter
- ❑ Computer I/O Option
- ❑ Printer Output Option
- ❑ Internal NiCad Battery Pack Option
- ❑ Includes Test Lead Kit



Specifications

DC Voltage

Range	Full Scale	Sensitivity	Input Res.
500mV	520.00mV	10µV	>1,000MΩ
5V	5.2000V	100µV	>1,000MΩ
50V	52.000V	1mV	10MΩ
500V	520.00V	10mV	10MΩ
1000V	1000.0V	100mV	10MΩ

Accuracy*

Ranges	24Hr, ±1°C	90days	1year
500mV, 50V, 1000V	0.0035+0.007	0.02+0.04	0.03+0.06
5V, 500V	0.0035+0.003	0.02+0.02	0.03+0.04

Max. Input (all ranges) 1000V(DC+ACp)
Temp. Coefficient ±(0.0032% of input + 0.002% FS)/°C, 0° to 50°C
Range Selection fast autoranging or manual
Conversion Rate 2 per second / 10 per second
Normal Mode Rejection 55dB min. (50/60Hz)
Common Mode Rejection 90dB min. (50/60Hz & DC), 1KΩ imbalance

AC Voltage (TRMS, AC, AC+DC)

Accuracy* AC or AC+DC (45Hz to 1KHz) ±(0.2% + 0.05%), ±(0.2% + 0.10%) on 500mV range, at inputs > 2% full scale
Frequency Response (relative to ref. freq.)

	Full	±(% of input), AC or AC+DC			
Range	Scale	10Hz to 20KHz	50KHz	100KHz	200KHz
500mV	520.00mV	0.5%	n.a.	n.a.	n.a.
5V	5.2000V	0.5%	0.5%	1.0%	2dB
50V	52.000V	0.5%	0.5%	1.0%	2dB
500V	520.00V	0.5%	n.a.	n.a.	n.a.
750V	750.00V	0.5%	n.a.	n.a.	n.a.

Max. Input (all ranges) 1000V (DC+ACp), 750V RMS
Input Impedance 1.1MΩ,<100pf with 10MΩ shunt resistance
Range Selection fast autoranging or manual (500mV is manual only)
Conversion Rate 2 per second / 10 per second
Crest Factor 3 : 1 at FS
Max. Volt•Hertz Product 1 x 10^7

Resistance

Open Circuit Voltage 4.2V typ, 520mV FS (low power) or 7.5V typ, 5.2V FS (high power)

Range	Full Scale	Low Power Test Current	High Power Test Current	Sensitivity
500Ω	520.00Ω	1mA	n.a.	10mΩ
5KΩ	5.2000KΩ	100µA	n.a.	100mΩ
50KΩ	52.000KΩ	10µA	100µA	1Ω
500KΩ	520.00KΩ	1µA	10µA	10Ω
5MΩ	5.2000MΩ	100nA	1µA	100Ω
50MΩ	52.000MΩ	n.a.	100nA	1KΩ

Accuracy*

Ranges	24hr, ±1°C	90days	1year
500Ω thru 5MΩ	0.01+0.007	0.03+0.04	0.04+0.07
50MΩ	0.02+0.01	0.05+0.05	0.07+0.08

Temp. Coefficient ±(0.01% of input + 0.007% FS) /°C, 0° to 50°C
Max. Input (all ranges) 750V (DC+ACp)
Range Selection fast autoranging or manual
Conversion Rate 2 per second / 10 per second

DC Current

Ranges	Full Scale	Sensitivity	Max. Burden V	Accuracy*
500µA	520.00µA	10nA	750mV	0.02+0.01
5mA	5.2000mA	100nA	750mV	0.02+0.01
50mA	52.000mA	1µA	750mV	0.02+0.01
500mA	520.00mA	10µA	1.00V	0.01+0.01
10A	10.000A	1mA	750mV	0.20+0.01

Temp. Coefficient ±(0.01% of input + 0.007% FS) per °C, 0° to 50°C
Fusing 600mA/3AG and 1A/BBS, 10A range fused with 10A/BBS
Range Selection fast autoranging or manual, 10A manual only
Conversion Rate 2 per second / 10 per second

AC Current (TRMS, AC+DC)

Accuracy (DC, 45Hz to 1KHz) ±(0.2% of input + 0.05% FS), at inputs > 2% full scale
Fusing 600mA/3AG and 1A/BBS, 10A range fused with 10A/BBS
Range Selection fast autoranging or manual, 10A range manual only
Conversion Rate 2 per second / 10 per second
Crest Factor 3 : 1 at FS

AC Current (cont.)

Range	Full Scale	Sensitivity	Max. Burden Voltage	Freq. Response (to 20KHz)
500µA	520.00µA	10nA	750mV	0.50%
5mA	5.2000mA	100nA	750mV	0.50%
50mA	52.000mA	1µA	750mV	0.50%
500mA	520.00mA	10µA	1.00V	0.60%
10A	10.000A	1mA	750mV	0.70%

Frequency Counter

Ranges 1KHz, 10KHz, 100KHz, 1MHz
Max. Indication 999.99Hz to 999.99KHz
Sensitivity 0.001% FS
Accuracy ±(0.005% of input + 0.001% FS)
Conversion Rate 2 per second typical

Voltage Range	Max. Freq.	Sensitivity	Current Range	Max. Freq.	Sensitivity
500mV	20KHz	40mV	500µA	20KHz	40µA
5V	500KHz	400mV	5mA	20KHz	400µA
50V	500KHz	4V	50mA	20KHz	4mA
500V	20KHz	40V	500mA	20KHz	40mA
750V	20KHz	40V	10A	20KHz	400mA

Note: Insufficient input signal results in frequency reading of 0.00.
Bar Graph Display voltage or current (not frequency)
Range Selection fast autoranging or manual, voltage/current ranging is independent of frequency ranging.

Decibels

Ranges all voltage ranges (DC, AC, AC+DC)
Range Selection fast autoranging or manual, per function
Ref. Impedance programmable from 1Ω to 99,999Ω (default is 600Ω)
Display Resolution 0.01dB (bar graph display not used for dB)

	@ ±0.10dB		@ ±0.01dB		
Range	Min. Input	dB	Min. Input	dB	Max. Input
500mV	0.77mV	-60.00	7.70mV	-40.00	-3.50dB
5V	7.70mV	-40.00	77.0mV	-20.00	16.50dB
50V	77.0mV	-20.00	770mV	0.00	36.50dB
500V	770mV	0.00	7.70V	20.00	56.50dB
750V	770mV	0.00	7.70V	20.00	59.70dB
1000V(DC)	770mV	0.00	7.70V	20.00	62.20dB

Diode Test

Checks semiconductor junction at approx. 100µA constant current and 4.2V typ. open circuit voltage (2.0000V FS). Bar graph displays voltage.

Uncertainty*	24hrs, ±1°C	90days	1year
	0.01+0.007	0.03+0.04	0.04+0.07

Continuity Operates on all resistance ranges. Trips at approx. 10% of range. Visual up/down indication. Selectable audible beeper. 50µsec typical response time. 150msec typical hold time.
Differential Peak Hold Dual polarity, high speed capture. VDC, mA DC, Ω—10msec (unit on range). VAC, V AC+DC, mA AC+DC—400msec (unit on range). Accuracy:±(1% of input + 0.1% FS) added to selected meter function. Droop:10cnts/s max. Bar graph: real-time input.
Other Functions REL, ZERO
Menu Functions STORE ALL, STORE INCLUSIVE, STORE EXCLUSIVE, STORE, RATE, RECALL, HI LIMIT, LO LIMIT, dB REF, REL SET
Isolated Interfaces Available IEEE-488: parallel I/O
Centronics: parallel printer bus
RS-232C: serial computer I/O, 300 to 9600 baud selectable
General Display: 5 full digits, allows 52,000 counts, neg. polarity indication. Bar Graph: 52-segment with independent polarity indication, 30msec conversion time, ±(0.1% of input + 1 segment) accuracy, 0.1% FS sensitivity. Audible overrange indication. Non-volatile RAM (battery backed) retains last user selections and storage readings with unit powered down. NiCad battery requires 24hrs of on-time every 60 days.
Protection 1000V (DC+ACp) max. from any input to earth ground. Transient protection to 6KV/100µsec on all inputs.
Power 120/240V selectable, 50-400Hz, 22VAmax.
Oper./Storage Temp. 0°C to 50°C/-40°C to 60°C
Oper./Storage Rel. Humidity 90% to 35°C/70% to 50°C
High Speed Conversion 10 per sec, add 0.04% FS uncertainty to all functions except Hz. Bar Graph accuracy is unchanged.
Physical 3.8"(H) x 10"(W) x 10.5"(D), (10 x 25 x 27cm), 5lbs (2.3Kg)

Specifications subject to change without notice.
*Accuracy specifications given as ±(% of input + % full scale).
Ref. Conditions: 15min. warm-up, 23±5°C ambient, 10-80% RH.

Digital Multimeters

460-6, 464-4

Exceptional accuracy and frequency response combined with extended measurement functions make the Models 460-6 and 464-4 a good choice for laboratory and service applications. The precision, 4.5 digit Model 460-6 can measure AC signals up to 100KHz and display the results in digital or analog (bar graph) form. ACV measurements can also be indicated in dB with switch selectable reference levels. For sensitive circuitry, the 460-6 gives you a choice of making high or low power resistance measurements. By using the low power setting, both test voltages and test currents are kept to minimum levels. In this way, accurate in-circuit measurements can be made without damaging components or causing digital IC's to switch on. Both the 460-6 and the 464-4 can handle complex, non-sinusoidal waveforms and give you accurate, true RMS readings. Audible continuity checking in both instruments lets you keep your eyes on the circuit under test and quickly find shorts and/or open circuits. For digital work, the high speed pulse detector in the 460-6 gives you visual and audible indication of fast transients. Both models offer choices of power input voltages. The 460-6 also includes rechargeable NiCad batteries for line isolation and field operation.

Models 460-6 & 464-4

- ❑ True RMS Readings
- ❑ Wide Frequency Response
- ❑ Diode Test
- ❑ Overload Protection
- ❑ 120/240 VAC Operation
- ❑ Includes Test Leads

Model 460-6

- ❑ Low Power Ω Measurements
- ❑ 4.5 Digit Accuracy
- ❑ Digital and Analog Display
- ❑ Pulse Detection
- ❑ dB Readings, Selectable Reference Levels
- ❑ Rechargeable NiCad Battery Operation

Specifications

	Model 460-6	Model 464-4
DC Voltage		
Ranges	⊢— 200mV, 2V, 20V, 200V, 1000V —⊣	
Max. Indication	199.99mV-1000.0V	199.9mV-1000V
Accuracy*	±(0.07% + 1)	±(0.1% + 1)
Input Resistance	>100MΩ(200mV), >10MΩ(other ranges)	
Overload Protection	500V (200mV)	1000V all ranges
(DC+ACp)	1000V (other ranges)	
Input Capacitance	⊢———— <100pf (all ranges) ————⊣	
Sensitivity	10µV (200mV range)	100µV (200mV range)
F.S. Step Response	⊢———— 1 sec ————⊣	
Normal Mode Rej.	50dB @ 50/60Hz	55dB @ 60Hz
AC Voltage (true RMS, AC coupled)		
Ranges	⊢— 200mV, 2V, 20V, 200V, 750V —⊣	
Max. Indication	199.99mV-750.0V	199.9mV-750V
Accuracy*		
20Hz-40Hz	±(1.5%+35)	±(1.5%+5)
40Hz-30KHz	±(1.0%+35)	±(1.0%+5)
30KHZ-50KHz	±(1.5%+35)	±(3.0%+5)
50KHz-100KHz	±(1.5%+35)	±(3.0%+5)

Accuracies apply to inputs ≥5% of range. The 750V range accuracy is not specified beyond 400Hz. The 200V range accuracy is not specified beyond 50KHz.

Crest Factor (F.S.)	⊢———— 3 : 1 ————⊣	
F.S. Step Response	⊢———— 3sec (to rated accuracy) ————⊣	
Input Capacitance	⊢———— <100pf (all ranges) ————⊣	
Overload Protection	300V (DC+ACp) or 250Vrms/200mV range	
	1000V (DC+ACp) or 750Vrms all other ranges	
Decibels (AC coupled TRMS, ACV only)		
Reference	0dB=1mW into 600Ω or 900Ω(switch selectable)	n.a.
Ranges	200mV-750V equivalent to -20dB through +58dB	n.a.
Sensitivity	0.01dB all ranges	n.a.
Accuracy	±0.5dB, upper 50% range ±1.0dB, lower 50% range	n.a.
F.S. Step Response	3sec (to rated accuracy)	n.a.
Crest Factor	>3:1 at full scale	n.a.
Over/Under Indication	none	n.a.

See AC Voltage spec.s for input impedance, overload, and freq. res.

Resistance		
Ranges	200Ω, 2KΩ, 20KΩ, 200KΩ, 2000KΩ, 20MΩ	
Max. Indication	199.99Ω-19.999MΩ	199.9Ω-19.99MΩ
Accuracy*		
200Ω-2000KΩ	±(0.15%+5)	±(0.5%+1)
20MΩ	±(0.3%+10)	±(1.0%+1)
Typical Full Scale Voltage and Test Current	(HI/LO)	
200Ω	200mV/200mV, 1mA/1mA	200mV, 1mA
2KΩ	2V/200mV, 1mA/100µA	2V, 1mA
20KΩ	2V/200mV, 100µA/10µA	2V, 100µA
200KΩ	2V/200mV, 10µA/1µA	200mV, 1µA
2000KΩ	2V/200mV, 1µA/100nA	2V, 1µA
20MΩ	2V/2V, 100nA/100nA	2V, 100nA
Overload Protection	⊢———— 750V (DC+ACp) ————⊣	
Open Circuit Volt.	<1V in LO (<6V in 200Ω) <6V in HI	5V
F.S. Step Response	1sec (7sec in 20MΩ)	2sec (7sec in 20MΩ)
Diode Test	Diode symbol shown on 2KΩ range. Measures fwd drop of junction (in mV) at approx. 1.0mA.	
DC Current		
Ranges	200µA, 2mA, 20mA, 200mA, 2000mA, 10A	
Max. Indication	199.99µA-10.000A	199.9µA-10.00A
Burden Voltage		
200µA-200mA	⊢———— 250mV ————⊣	
2000mA	1V	900mV
10A	750mV	300mV
F.S. Step Response	⊢———— 1sec (to rated accuracy) ————⊣	
Accuracy*		
200µA-20mA	⊢———— ±(0.5%+1) ————⊣	
200mA	±(0.75%+1)	±(0.5%+1)
2000mA	⊢———— ±(0.75%+1) ————⊣	
10A	⊢———— ±(1%+1) ————⊣	

	Model 460-6	Model 464-4
DC Current (cont.)		
Overload Protection	⊢— 2A/250V fuse and 3A/600V in series —⊣	
	(10A: 10A/600V)	(10A unfused)
AC Current		
Ranges	200µA, 2mA, 20mA, 200mA, 2000mA, 10A	
Max. Indication	199.99µA-10.000A	199.9µA-10.00A
Accuracy*		
200µA-200mA	±(2.0%+35),20Hz-40Hz	±(2.0%+5),20Hz-40Hz
	±(1.5%+35),40Hz-1KHz	±(1.5%+5),40Hz-10KHz
2000mA	±(2.0%+35),20Hz-40Hz	±(2.25%+5),20Hz-40Hz
	±(1.5%+35),40Hz-1KHz	±(1.75%+5),40Hz-10KHz
10A	±(2.5%+35),20Hz-40Hz	±(2.5%+5),20Hz-40Hz
	±(2.0%+35),40Hz-1KHz	±(2.0%+5),40Hz-10KHz
Burden Voltage		
200µA-200mA	⊢———— 250mV ————⊣	
2000mA	1V	900mV
10A	750mV	300mV
Overload Protection	⊢— Same as DC Current specifications. —⊣	
Crest Factor (F.S.)	⊢———— 3 : 1 ————⊣	
F.S. Step Response	⊢———— 3sec (to rated accuracy) ————⊣	
Bar Graph		
Sensitivity	10mV-200mV range (LO)	n.a.
(DCV & DCmA)	1mV-200mV range (HI) 1dB all ranges	
Accuracy	±(5% of input+1 segment) ±(1dB+1segment)	n.a.
Max. Indication	110% of range (200mV-200V, 200µA-200mA), 100% of range (750VAC, 1000VDC, and 2000mA)	n.a.
F.S. Step Response	150msec (VDC, DCmA)	n.a.
Absolute Value Pulse Detector (200KΩ range)		
Reference Level	Approx. 0.4V	n.a.
Display	▲ for values > ref. ▼ & audio for values < ref.	n.a.
Min. Pulse Width	50µs (for 0V to ±1V pulse)	n.a.
Input Impedance	>65kΩ in parallel with <100pf (up to ±35V)	n.a.
Overload Protection	750V (DC + ACp)	n.a.
Continuity		
Indication	audio & displayed ▲ or ▼	audio tone
Response Time	50µsec	1.5msec
Threshold Level	20% full scale	25% full scale
Overload Protection	⊢———— 750V (DC + ACp) ————⊣	
Isolation	1000V (DC+ACp) max. COM to earth gnd	
Transient Protection	6kV/100µs on all voltage & Ω ranges	
Display		
Numerical	4.5 digit, 0.5", LCD	3.5 digit, 0.56", LED
Bar Graph	20-seg. LCD, 2-seg. overrange	n.a.
Conversion Rate	numerical-2 readings/sec bar graph-80 readings/sec	3 readings/sec
DC Polarity	⊢———— "-" indicated, "+" implied ————⊣	
Power Requirements		
AC Line	⊢———— 120 or 240VAC ————⊣ (±10%, 50-400Hz)	
Battery Operation	40 hrs. with full charge	n.a.
Battery Charge	16 hrs.	n.a.
Battery Type	(1) 6V NiCad (included)	n.a.
Low Battery Indicator	"B" (8hrs remain)	n.a.
Environment		
Oper./Stor. Temp.	⊢———— 0° to 55°C / -40° to 60°C ————⊣	
Temp. Coefficient	<0.1 x accuracy/°C (0° to 18°C & 28° to 55°C)	
Relative Humidity	90% to 35°C, 70% to 55°C (non-conden.)	
Physical		
Dimensions	⊢— 2.7 x 8.4 x 9.0 inches (7 x 21 x 23 cm.) —⊣	
Weight	3.3lbs (1.5Kg)	3lbs (1.4Kg)

Specifications subject to change without notice.

*Accuracy specifications given as ±(% of input + counts).

All specifications are valid for operating temperatures of 18°C to 28°C at a relative humidity up to 90% unless otherwise noted.

Digital Multimeters

467-2T, 467-2, 467-E

The Models 467-2T, 467-2, and 467E are good examples of Simpson's ability to combine a wide range of advanced DMM features with the convenience of small size and battery operation. Designed specifically for the telecommunications industry, the 467-2T provides direct dB ACV readings with switch selectable 600Ω and 900Ω references. Also included for telecom work is a built-in, low distortion 1004Hz sine wave oscillator. All three models allow you to measure the true RMS of complex, non-sinusoidal waveforms with 3.5 digit accuracy. The 467-2T and 467-2 have Simpson's Digalog™ display which combines the best features of precise digital readout and fast analog approximation (via bar graph). Working with transient voltages/currents is simplified with the differential peak hold function included in the 467-2T and 467-2. Also included in both of these models is a 50μS pulse detector useful for digital troubleshooting. To make your continuity checking both faster and easier, all three models have an audible tone so that your eyes can remain fixed on the probe location. The 467-2T and 467-E have three low power resistance ranges to allow accurate, in-circuit readings without endangering sensitive components or causing digital circuits to change state. With the emphasis on maximum functionality and portability, the 467-2 series is ideal for serious field service, telecommunications, or plant maintenance work. Each is UL 1244 listed for safety.

Models 467-2T, 467-2, 467-E

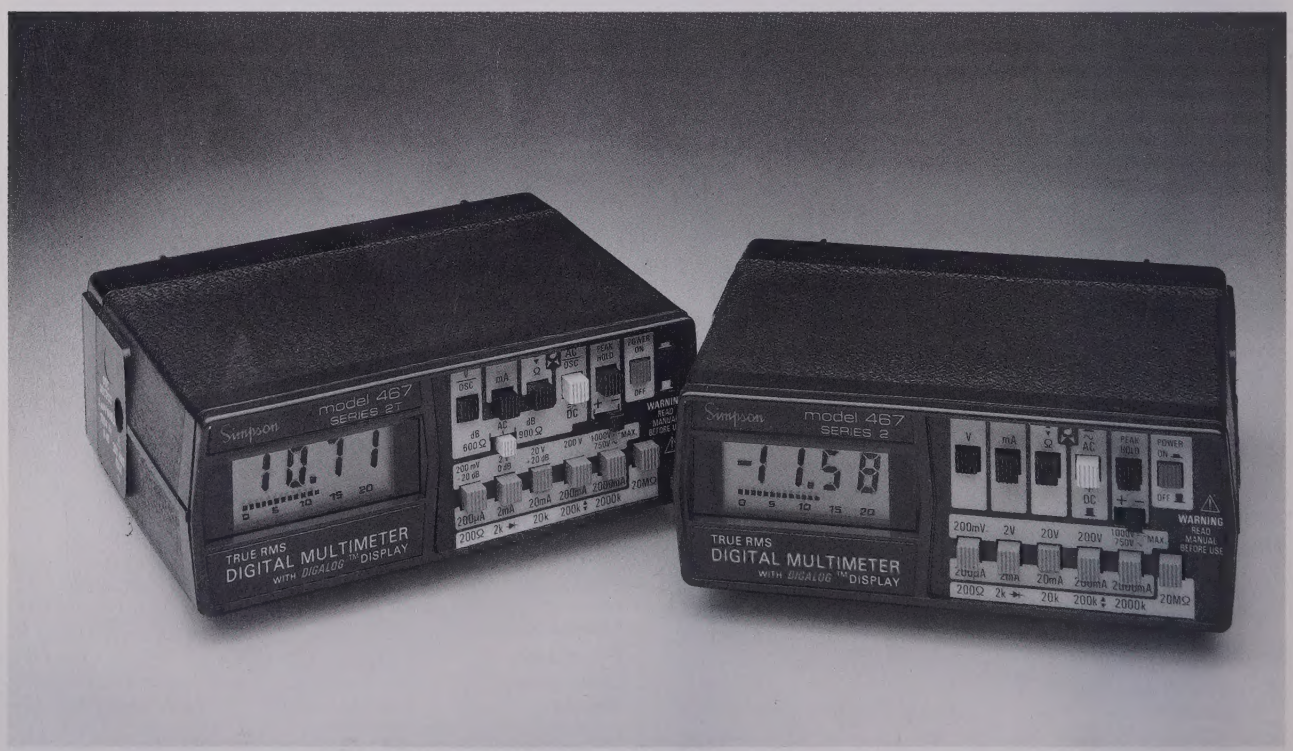
- ❑ 3.5 Digit Accuracy
- ❑ True RMS ACV Readings
- ❑ Audible Continuity Checking
- ❑ Differential Peak Hold (Single Polarity on the 467-E)
- ❑ Diode Testing
- ❑ Overload Protection
- ❑ Compact Size, Low Weight
- ❑ Battery Operation (9V)
- ❑ UL 1244 Listed
- ❑ Includes Test Leads and Battery

Models 467-2T & 467-2

- ❑ Fast Pulse Detection
- ❑ Combined Digital/Analog Display
- ❑ Peak Hold, Polarity is Switch Selectable

Model 467-2T

- ❑ Built-in 1004Hz Oscillator
- ❑ Direct Readings in dB
- ❑ Switchable dB Reference (600Ω/900Ω)
- ❑ Includes Oscillator Cable



Specifications

Models	467-2T	467-2	467-E
DC Voltage			
Ranges	200mV, 2V, 20V, 200V, 1000V		
Max. Sensitivity	100µV on 200mV range		
Max. Indication	1000V		
Accuracy*	±(0.1%+1)		
Input Impedance	10MΩ		
Common Mode Rej.	>120dB-50/60Hz		
Normal Mode Rej.	>50dB-50/60Hz		
F.S. Step Response	1sec		
Overload Protection	1000V (DC+ACp)		
AC Voltage			
Ranges	200mV, 2V, 20V, 200V, 750V		
Max. Sensitivity	100µV on 200mV range		
Max. Indication	750V		
Accuracy*			
20Hz-40Hz	±(1.5%+5)		
40Hz-1KHz	±(0.5%+5)		
1KHz-5KHz	±(5%+5)		
5KHz-20KHz	±1dB typical (200mV, 2V, 20V ranges)		
20KHz-100KHz	±3dB typical (200mV, 2V, 20V ranges)		
Note: For the 750V range, accuracy specs. are valid to 400Hz only.			
Freq. Response	20Hz-100KHz		
Input Impedance	10MΩ, <100pf		
Conversion Type	true RMS (AC coupled)		
Crest Factor	3 : 1		
F.S. Step Response	3sec		
Overload Protection	1000V (DC+ACp) or 750V RMS		
	Volt-Hertz product not to exceed 10^7		
Resistance			
Ranges	200Ω, 2KΩ, 20KΩ, 200KΩ, 2000KΩ, 20MΩ		
Max. Sensitivity	0.1Ω on the 200Ω range		
Max. Indication	19.99MΩ		
Accuracy*			
thru 2000KΩ	±(0.25%+1)		
20MΩ	±(1.0%+1)		
Open Circuit Voltage			
200Ω/2KΩ/20MΩ	2.4V		
20KΩ/200KΩ/2000KΩ	0.6V	0.45V	
Continuity Test	audible and visual		
Diode Test	on 2KΩ range		
F.S. Step Response	1sec (7sec on 20MΩ range)		
Overload Protection	750V (DC+ACp)		
DC Current			
Ranges	200µA, 2mA, 20mA, 200mA, 2000mA		
Max. Sensitivity	0.1µA on the 200µA range		
Max. Indication	1999mA		
Accuracy*	±(0.5%+1) thru 20mA		
	±(0.75%+1) 200mA, 2000mA		
Burden Voltage	250mV max. (1V on 2000mA range)		
F.S. Step Response	1sec		
Overload Protection	2A double fused		
AC Current			
Ranges	200µA, 2mA, 20mA, 200mA, 2000mA		
Max. Sensitivity	0.1µA on the 200µA range		
Max. Indication	1999mA		
Accuracy*	±(2.0%+5) 20Hz-40Hz		
	±(1.5%+5) 40Hz-1KHz		
Freq. Response	20Hz-1KHz		
Conversion Type	true RMS (AC coupled)		
Crest Factor	3 : 1		
F.S. Step Response	3sec		
Burden Voltage	250mV max. (1V on 2000mA range)		
Overload Protection	2A double fused		
Decibels (VAC, true RMS only)			
Ranges			
200mVAC	-60dB to -20dB	n.a.	n.a.
2VAC	-40dB to 0dB		
20VAC	-20dB to 20dB		
Max. Sensitivity	0.1dB all ranges	n.a.	n.a.
Accuracy			
upper 50% of range	±0.5%	n.a.	n.a.
lower 50% of range	±1.0%		

Models	467-2T	467-2	467-E
Decibels (cont.)			
Reference	0dB=1mW into 600/900Ω (selectable)	n.a.	n.a.
Input Impedance	10MΩ, 100pf	n.a.	n.a.
Freq. Response	20Hz-100KHz	n.a.	n.a.
F.S. Step Response	2sec	n.a.	n.a.
Crest Factor	3 : 1	n.a.	n.a.
Overload Protection	1000V(DC+ACp)	n.a.	n.a.
Bar Graph			
Max. Sensitivity	10mV on 200mV range 1dB on all ranges		n.a.
Max. Indication	110% of range, or max. input on 750VAC range		n.a.
Accuracy	±(5% of input+1 segment) ±(1dB+1 segment)		n.a.
F.S. Step Response	150msec		n.a.
Differential Peak Hold			
Accuracy*			
VDC	±(1.0%+10)		n.a.
DC Current	±(1.5%+10)		n.a.
VAC (100Hz-1KHz)	±(3%+10)		n.a.
AC Current	±(3%+10)		
Acquisition Time			
VDC & DC Current	10msec min. duration for square pulses		n.a.
VAC	200msec min.		n.a.
Display Decay Rate	1 count per second (max.)		n.a.
Pulse Detection (absolute value)			
Reference Level	approx. ±0.4V		n.a.
Display Indicators	yes		n.a.
Pulse Response	50µsec min. width for 0 to ±1V pulses. Display held for 100msec.		n.a.
Input Impedance	>65KΩ, <100pf		n.a.
Overload Protection	750V (DC+ACp)		n.a.
Continuity Test (200Ω & 2KΩ ranges)			
Display	audible & visual		
Response Time	50µsec min. duration		
Overload Protection	750V (DC+ACp)		
Oscillator Output			
Frequency	1004Hz ± 5Hz	n.a.	n.a.
Amplitude	0dB±0.2dB into 600Ω	n.a.	n.a.
Distortion	<1% (sine wave)	n.a.	n.a.
Output Impedance	600Ω	n.a.	n.a.
Overload Protection	1/8A,125V fuse	n.a.	n.a.
Temp. Coefficient	<0.1Hz & 0.02dB/°C (0-18°C, 28-55°C)	n.a.	n.a.
Isolation (DC+ACp)	1000V max. circuit to earth gnd.		
	30VRMS (osc. output)	n.a.	n.a.
Transient Protection	6KV, 100µsec all V & Ω ranges		
Display			
Numeric Display	3.5-digit,0.4",LCD		3.5-digit,0.5",LCD
Bar Graph Display	20-seg LCD w/2-seg overrange		n.a.
DC Polarity	"-" indicated, "+" implied		
Conversion Rate	3/sec numeric readings 60/sec bar graph readings		n.a.
Power Requirement			
Battery Type	9V alkaline (NEDA 1604A)		
Battery Life	100hrs	200hrs	
Environmental			
Oper./Storage Temp.	0 to 55°C/-40°C to 60°C		
Relative Humidity	90% to 35°C, 70% to 55°C (non-condensing)		
Temp. Coefficient	<0.1 x accuracy /°C (0 to 18°C, 28 to 55°C)		
Physical			
Case Material	high impact ABS		
Dimensions	2"(H) x 5.6"(W) x 4.6"(D) (5 x 14 x 12cm)		
Weight	1.5lbs (0.5Kg)		

Specifications subject to change without notice.

*Accuracy specifications given as ±(% of input + counts).

All specifications are valid for operating temperatures of 18°C to 28°C at a relative humidity up to 90% unless otherwise noted.

Digital Multimeters

463, 461-2R, 461-2, 462

Compact, economical, and yet capable of handling typical industrial electronics test procedures, the Models 463, 461-2R, 461-2, and 462 are some of Simpson's most popular DMM's. Each model has a large 3.5 digit display and up to 26 measurement ranges. The low current drain circuitry and LCD readout in the 463 provides 200 hours of continuous operation on a standard 9V alkeline battery. Each of the other models have built-in, rechargeable NiCad batteries and a choice of 120VAC or 230VAC power adapters. A full charge provides 8 hours of continuous operation. For accurate AC work, the Model 461-2R can provide you with true RMS readings of complex, non-sinusoidal waveforms up to 50KHz. The frequency response limits of the other three average sensing meters range from 20KHz to 5KHz. For situations requiring maximum ease of use, the Model 462 has voltage and resistance autoranging along with the standard manual pushbutton controls. The battery operated 463 and the other 120VAC models are UL listed.

Models 463, 461-2R, 461-2, & 462

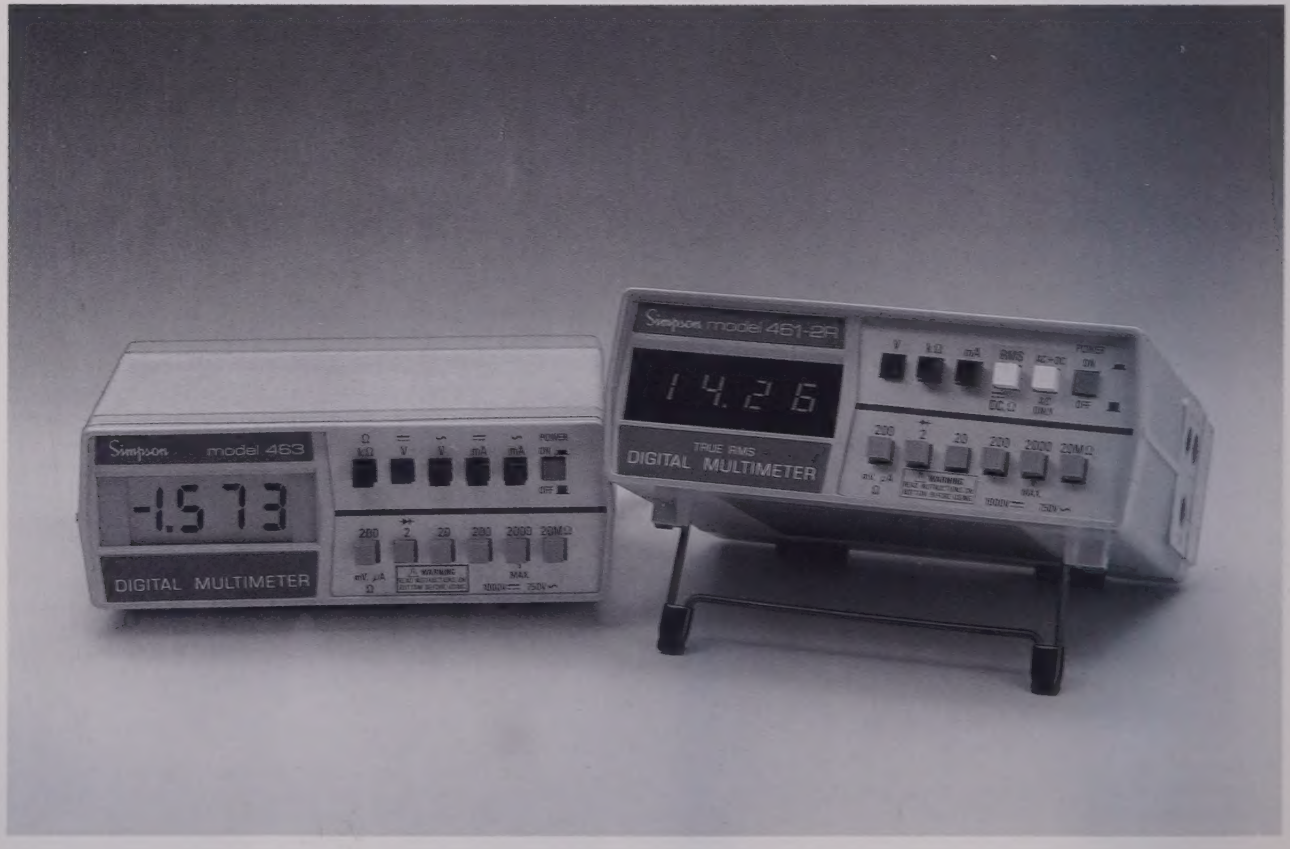
- ❑ Compact, Portable Size
- ❑ Large LCD (463) or LED 3.5-Digit Displays
- ❑ Up to 26 Measurement Ranges
- ❑ Overload Protection
- ❑ UL Listed
- ❑ Battery Operation
- ❑ Includes Test Leads and Batteries

Model 461-2R

- ❑ True RMS AC and AC+DC Readings
- ❑ 50KHz Frequency Response

Model 462

- ❑ Autoranging



Specifications

Models	463	461-2R	461-2	462
DC Voltage				
Ranges	200mV, 2V, 20V, 200V, 1000V			
Max. Sensitivity	0.1mV on the 200mV range			
Max. Indication	1000V			
Accuracy*	±(0.1%+1)			±(0.25%+1)
Input Impedance	10MΩ			
Common Mode Rej.	>120dB-60Hz			
Normal Rej. (60Hz)	>50dB	>55dB		>40dB
F.S. Step Response	1 sec			3 sec
Overload Protection (DC + ACp)	1100V	1000V		(650V on 200mV, 2V)
AC Voltage				
Ranges	200mV, 2V, 20V, 200V, 750V (600Vmax. for 462)			
Max. Sensitivity	0.1mV on 200mV range			
Max. Indication	750V			600V
Accuracy*				
200mV	±(1.5%+3) 20-40Hz ±(0.5%+2) 40Hz-1KHz	±(0.5%+3) 20Hz-10KHz ±(5%+3) 10-50KHz	±(0.5%+2) 20Hz-1KHz ±(5%+2) 1-10KHz	±(0.75%+5) 50Hz-1KHz ±(5%+5) 1-5KHz
2V				
20V	±(1.5%+3) 1-10KHz ±(5%+5) 10-20KHz	±(0.5%+3) 20Hz-1KHz ±(1.5%+3) 1-10KHz ±(5%+3) 10-20KHz	±(0.5%+3) 20Hz-1KHz	±(0.75%+2) 50Hz-1KHz ±(5%+2) 1-5KHz
200V	±(1.5%+3) 20-40Hz ±(0.5%+2) 40-400Hz	±(0.5%+3) 20Hz-1KHz		
750V (600V on the 462)	±(1.5%+3) 20-400Hz	±(1%+3) 20-400Hz	±(1.0%+3) 20-400Hz	±(0.75%+2) 50-400Hz
Freq. Response	20Hz-20KHz	20Hz-50KHz	20Hz-10KHz	50Hz-5KHz
Input Impedance	10MΩ, 100pf			9MΩ, 100pf
Conversion Type	average	true RMS	average	average
Crest Factor	n.a.	3 : 1 min.	n.a.	n.a.
F.S. Step Response	3 sec			7 sec
Overload Protection (DC + ACp)	1100V	1000V (250V on 200mV, 2V)	1000V (750V on 200mV, 2V)	600Vrms (240V on 200mV, 2V)
Resistance				
Ranges	200Ω			n.a.
	2KΩ, 20KΩ, 200KΩ, 2000KΩ, 20MΩ			
Max. Sensitivity	0.1Ω on 200Ω			1Ω on 2KΩ
Max. Indication	19.99MΩ			
Accuracy*				
thru 2000MΩ	±(0.25%+2)			±(0.5%+1)
20MΩ	±(0.75%+2)			±(1%+1)
Open Circuit Voltage	<3.5V	<3V	<3V	2V
Diode Test	2K range			
F.S. Step Response	1 sec (7sec-20MΩ)	1 sec (3sec-20MΩ)	1 sec (3sec-20MΩ)	7 sec (all ranges)
Overload Protection	250Vrms			

Models	463	461-2R	461-2	462
DC Current				
Ranges	200µA			n.a.
	2mA, 20mA, 200mA, 2000mA			
Max. Sensitivity	0.1µA on 200µA			1µA on 2mA
Max. Indication	1999mA			
Accuracy*				
thru 20mA	±(0.5%+2)			±(1%+1)
200mA	±(0.5%+2)	±(0.75%+2)	±(0.75%+2)	±(1%+1)
2000mA	±(1%+2)	±(0.75%+2)	±(0.75%+2)	±(1.5%+1)
Burden Voltage	200mV			
F.S. Step Response	1 sec			
Overload Protection	2A, double fused			
AC Current				
Ranges	200µA			n.a.
	2mA, 20mA, 200mA, 2000mA			
Max. Sensitivity	0.1µA on 200µA			1µA on 2mA
Max. Indication	1999mA			
Accuracy*				
thru 20mA	±(1.5%+3) 40Hz-1KHz ±(5%+5) 1KHz-5KHz	±(1%+2) 20Hz-1KHz	±(1%+2) 20Hz-1KHz	±(1.5%+5) 50Hz-1KHz
200mA		±(1.5%+2) 20Hz-1KHz	±(1.5%+2) 20Hz-1KHz	
2000mA				±(2%+5) 50Hz-1KHz
Freq. Response	40Hz-5KHz	20Hz-1KHz	20Hz-1KHz	50Hz-1KHz
Conversion Type	average	true RMS	average	average
Crest Factor	n.a.	3 : 1	n.a.	n.a.
F.S. Step Response	3 sec			5 sec
Burden Voltage	200mV			
Overload Protection	2A, double fused			
Isolation (DC + ACp) (circuit to earth gnd)	1000V (charger disconnected)			300V (charger connected)
Display	3.5 digit 0.5" LCD		3.5 digit 0.3" LED	
DC Polarity	"-" displayed, "+" implied			
Conversion Rate	3 per sec			
Power Requirements				
AC	n.a.	120VAC or 230VAC		
DC	9V alkaline	(4)AF NiCad rechargeable		
Battery Life	200 hrs	8 hrs before recharge		
Environmental				
Operating Temp.	5°C-40°C	0°C-55°C		
Storage Temp.	-40°C-60°C	-40°C-60°C		
Relative Humidity	0-95% to 30°C 75% up to 40°C	0-90% non-condensing		
Temp. Coefficient	<0.1 times the applicable accuracy spec. per °C			
Physical				
Case Material	high-impact ABS			
Dimensions	2"(H) x 5.6"(W) x 4.6"(D), (5cm x 14cm x 12cm)			
Weight	1lb. (0.5Kg)	1.5lb with batteries, (0.7Kg)		

Specification subject to change without notice

*Accuracy specifications given as ±(% of input + counts)

Digital Multimeters

488, 487

Hand-held convenience with benchtop specifications make the Model 487 and Model 488 two standouts in Simpson's broad DMM product line. Combining the best of both digital and analog displays, the daylight readable LCD has 3.75 digits and incorporates a high resolution, 71-segment bar graph. Like a traditional analog display, the bar graph provides a quick visual indication of the reading and rate of change. The Model 488 is able to provide true RMS readings for complex, non-sinusoidal waveforms over a broad 20KHz frequency range. Audible continuity checking frees you from having to visually monitor the display and speeds the troubleshooting process. Advanced features not commonly found in hand-held DMM's, such as Peak Hold and Data Hold, let you find and analyze transients which might otherwise go unnoticed. The unique design of the cases provides an exceptionally high degree of shock protection. Special, built-in pockets ensure that the test leads will stay with the meter.

Models 488 & 487

- ❑ Hand-held Portability
- ❑ Battery Operation (9V)
- ❑ Special Test Lead Pockets
- ❑ 3.75-Digit, LCD Readout
- ❑ High Resolution, 71-Segment Bar Graph
- ❑ 20KHz Frequency Response
- ❑ Autoranging
- ❑ Data Hold & Peak Hold
- ❑ Diode Testing
- ❑ Audible Continuity Checking
- ❑ Overload Protection
- ❑ Includes Test Leads, Battery, and Neck Strap

Model 488

- ❑ True RMS ACV Readings

Specifications

	Model 488	Model 487
DC Voltage		
Ranges	300mV, 3V, 30V, 300V, 1000V	
Max. Sensitivity	0.1mV on the 300mV range	
Accuracy[1]	±(0.1%+1)	
Input Impedance	10MΩ 40pf (100MΩ 40pf on 300mV range)	
Common Mode Rejection	>120dB	
Normal Mode Rejection	>50dB @ 50/60Hz	
Response Time[2]	1.5sec-numeric display, 0.7sec-bar graph	
Overload Protection	1200VRMS (500VRMS/10min on 300mV range)	
Temp. Coefficient[1,3]	±(0.05%+1), ±(0.1%+1) on 1000V range	
Battery Voltage Effect[4]	±2counts	
AC Voltage		
Ranges	300mV, 3V, 30V, 300V, 750V	
Max. Sensitivity	0.1mV on the 300mV range	
Accuracy[1] **(45-65Hz)**	±(0.75%+3)	±(0.5%+2)
Response Time[2]	1.5sec-numeric display, 0.7sec-bar graph	
Freq. Response[1]	15-30Hz, ±(1.0%+3)	
(relative to 45-65Hz	30-45Hz, ±(0.5%+3)	
spec.,>300 counts)	65-400Hz, ±(0.5%+3) or ±(2.0%+3) on 750V range	
	400Hz-1KHz, ±(1.0%+3) or ±(2.0%+3) on 750V range	
	1KHz-4KHz, ±(2.0%+3)	
	4KHz-20KHz, ±(2.0%+3)	4KHz-20KHz, ±(5.0%+3)
Note: 750V range freq. response extends only to 1KHz.		
Input Impedance	10MΩ 40pf (100MΩ 40pf on 300mV range)	
Conversion Type	true RMS	average
Crest Factor	3:1, ±(1.0% of input)	n.a.
	5:1, ±(3.0% of input)	n.a.
Common Mode Rej.(50-60Hz)		
300mV range	>100dB	
3V & 30V ranges	>80dB	
300V range	>70dB	
750V range	>60dB	
Normal Mode Rej. (DC)	>110dB	
Overload Protection	1200VRMS (500VRMS/10min on 300mV range)	
Temp. Coefficient[1,3]	±(0.2%+3)	±(0.3%+2)
Battery Voltage Effect[4]	±3 counts	±8 counts
Resistance		
Ranges	300Ω, 3KΩ, 30KΩ, 300KΩ, 3MΩ, 30MΩ	
Max. Sensitivity	0.1Ω on 300Ω range	
Accuracy[1]		
300Ω range	±(0.4%+3)	
3-300KΩ ranges	±(0.2%+1)	
3MΩ range	±(0.4%+1)	
30MΩ range	±(2.0%+1)	
Open Circuit Voltage (max.)	1.25V (3.2V on 300Ω range)	
Response Time[5]	2sec-numeric display, 1.5sec bar graph (5sec-num, 4sec-bar graph on 30MΩ range)	
Temp. Coefficient[1,3]		
300Ω range	±(0.15%+2)	
3KΩ-3MΩ ranges	±(0.1%+1)	
30MΩ range	±(0.6%+1)	
Overload Protection	500VRMS for 10min	
Battery Voltage Effect	±3counts, ±4counts on 300Ω range	
Diode/Continuity Test		
Range	2VDC	
Open Circuit Voltage	3.2V max.	
Accuracy[1]	±(0.1%+1)	
Overload Protection	500VRMS for 10min	
Continuity Threshold	60Ω for continuous sound	
	60-540Ω (approx.) for beeping sound	
DC Current		
Ranges	300µA, 3mA, 30mA, 300mA, 3A, 10A	
Max. Sensitivity	0.1µA on the 300µA range	
Accuracy[1]		
300µA range	±(1.0%+2)	
3mA-3A ranges	±(0.75%+1)	
10A range	±(1.0%+2)	
Burden Voltage		
300µA, 3mA ranges	150mV	
30mA, 10A ranges	160mV	
300mA range	200mV	
3A range	650mV	
Overload Protection	3.15A/500V fuse (10A unfused)	

	Model 488	Model 487
DC Current (cont.)		
Temp. Coefficient[1,3]		
300µA range	±(0.5%+2)	
3mA thru 3A ranges	±(0.4%+1)	
10A range	±(0.5%+1)	
Max. Current		
300µA — 300mA ranges	2.5A for 5min or 1A RMS	
3A range	3.6A RMS	
10A range	15A for 5min or 12A RMS	
Battery Voltage Effect[4]	±4 counts	
AC Current		
Ranges	300µA, 3mA, 30mA, 300mA, 3A, 10A	
Max. Indication	0.1µA on the 300µA range	
Accuracy[1,6] **(45-65Hz)**		
300µA range	±(1.75%+4)	±(1.5%+2)
3mA thru 3A ranges	±(1.5%+4)	±(1.2%+2)
10A range	±(1.75%+4)	±(1.2%+2)
Freq. Response	15-30Hz, ±(1.0%+3)	
(relative to 45-65Hz	30-45Hz, ±(0.5%+3)	
spec., >300 counts)	65Hz-1KHz, ±(3.0%+3)	
Temp. Coefficient[1,3]		
300µA range	±(0.75%+3)	±(0.75%+2)
3mA thru 10A ranges	±(0.6%+3)	
Overload Protection	3.15A/500V fuse (10A unfused)	
Max. Current		
300µA — 300mA ranges	2.5A for 5min or 1A RMS	
3A range	3.6A RMS	
10A range	15A for 5min or 12A RMS	
Crest Factor	3:1, ±(1.0% of input)	n.a.
	5:1, ±(3.0% of input)	n.a.
Battery Voltage Effect[4]	±5 counts	±10 counts

Data Hold Accuracy ±1 count (all functions and ranges)

Peak Hold Accuracy ±2 counts (all functions and ranges)

Range Selection Autoranging and manual ranging on all voltage and resistance functions. Current function is manual only. 300mV (AC and DC) is manual only.

Display

Numerical Display	3.75-digit, 0.4" LCD
Bar Graph Display	2",71-segments (DC), 1.8", 61-segments (AC, Ω)
Max. Indication	3099 counts (numeric), 3050 counts (bar graph)
Overrange Indication	MSD 3 (2 on diode test), other digits blanked bar graph- ">" if over 3050 counts
DC Polarity	"-" displayed, "+" implied, bar graph independent of numeric display
Conversion Rate	numeric-2.2 readings per second

Isolation 1000V (DC+AC_P) max. circuit to earth gnd

Power Requirements

Battery Type	9V NEDA 1604
Battery Life	Approx. 1000hr (DC), 200hr (AC)
Low Battery Indication	"-II-" displayed at approx. 7V

Environmental

Storage/Operating Temp.	0 to 50°C/-25 to 65°C
Relative Humidity	up to 75%

Physical

Dimensions	3.9 x 7.3 x 1.9 inches (10 x 19 x 5 cm)
Weight	Approx. 1.1lb (0.5Kg)

Safety Double insulated (1000V nom.), Class II, test voltage 6KV.

Specifications subject to change without notice

[1]Accuracy specifications given as ±(% of input + counts).
[2]0-80% of range, within range.
[3]5° to 21°C, 25° to 40°C, 10°C change.
[4]Low battery indication to 7.9V and 8.1V to 10.00V.
[5]Open circuit to 50% of range, in range.
[6]For inputs greater than 10 counts.

Digital Multimeters

474, 470

The Models 474 and 470 DMM's are marked by their low cost while maintaining a professional range of measurement capabilities. Both meters are packaged in rugged ABS cases with flush, thumbwheel style controls. The large, high contrast, LCD readouts promote low current drain resulting in an average battery life of one year. Although the 3.5-digit 470 is sufficient for most troubleshooting situations, the high resolution and accuracy provided by the 4.5-digit 474 can be the critical edge needed when working with sensitive analog circuitry. Both models include audible continuity checking, so you can keep your eyes on your work, and a simple diode test setting to quickly verify a junction's voltage drop.

Models 474 & 470

- ❑ Low Cost
- ❑ Full Range of Functions
- ❑ Rugged Construction
- ❑ Recessed Controls
- ❑ Audible Continuity Checking
- ❑ Diode Testing
- ❑ Daylight Visible 3.5 or 4.5-Digit LCD Readouts
- ❑ Battery Operation (9V)
- ❑ Two-way Tilt Stand
- ❑ Double Fused Overload Protection
- ❑ Includes Test Leads and Battery

Specifications

	Model 474	Model 470
DC Voltage		
Ranges	200mV, 2V, 20V, 200V, 1000V	
Max. Sensitivity	10µV on 200mV	100µV on 200mV
Max. Indication	1000V	
Accuracy*	±(0.07%+1) ±(0.03%+2) on 200mV	±(0.15%+1)
Input Impedance	10MΩ	
Common Mode Rej.	>100dB-60Hz	>105dB-60Hz
Normal Mode Rej.	>50dB-60Hz	
F.S. Step Response	1sec	
Overload Protection	1000V (DC+ACp) 250V (DC+ACp) on 200mV	1000V (DC+ACp)
AC Voltage		
Range	200mV, 2V, 20V, 200V, 750V	
Max. Sensitivity	10µV on 200mV	100µV on 200mV
Max. Indication	750V	
Accuracy*		

200mV	±(1.0%+5) 45-500Hz ±(1.0%+10) 500Hz-1KHz	±(1%+5) 45Hz-1KHz ±(3%+5) 500Hz-1KHz on 2V range
2V	±(1.0%+5) 45-500Hz ±(3%+10) 500Hz-1KHz	
20V thru 750V	±(1.0%+5) 45-500Hz ±(1.0%+10) 500Hz-1KHz	

Freq. Response	45Hz-1KHz	
Input Impedance	10MΩ, 100pf	
Conversion Type	average	
F.S. Step Response	3sec	
Overload Protection	1000V (DC+ACp)	1000V (DC+ACp)
200mV range only	250V (DC+ACp)	300V (DC+ACp)
Resistance		
Ranges	200Ω, 2KΩ, 20KΩ, 200KΩ, 20MΩ	
Max. Sensitivity	0.01Ω on 200Ω	0.1Ω on 200Ω
Max. Indication	19.99MΩ	
Accuracy*		
200Ω	±(0.2%+10)	±(0.5%+2)
2KΩ thru 200KΩ	±(0.2%+2)	±(0.5%+2)
20MΩ	±(0.4%+2)	±(2.0%+2)
Open Circuit Voltage	<3.5V	
Continuity Test	on 2KΩ range, audible	
Diode Test	on 2KΩ range	
F.S. Step Response	1sec (7sec on 20MΩ range)	
Overload Protection	250V (DC+ACp)	

	Model 474	Model 470
DC Current		
Ranges	2mA, 20mA, 200mA, 2000mA, 10A	
Max. Sensitivity	0.1µA on 2mA	1µA on 2mA
Max. Indication	10.00A	
Accuracy*		
thru 200mA	±(1.0%+1)	
2000mA, 10A	±(2.0%+1)	
Burden Voltage (max.)	250mV 900mV on 2000mA 300mV on 10A	250mV 1V on 2000mA 300mV on 10A
F.S. Step Response	1sec	
Overload Protection	2A double fused (10A unfused)	
AC Current		
Ranges	2mA, 20mA, 200mA, 2000mA, 10A	
Max. Sensitivity	0.1µA on 2mA	1µA on 2mA
Max. Indication	10.00A	
Accuracy (45Hz-1KHz)*	±(2.0%+5) ±(3.0%+5) on 2000mA, 10A	
Freq. Response	45Hz-1KHz	
Conversion Type	average	
F.S. Step Response	3sec	
Burden Voltage (max.)	250mV 900mV on 2000mA 300mV on 10A	250mV 1V on 2000mA 300mV on 10A
Overload Protection	2A double fused (10A unfused)	
Isolation (DC+ACp)	1000V max. circuit to earth gnd.	
Display		
Numeric Display	4.5-digit,0.4",LCD	3.5-digit,0.5",LCD
DC Polarity	"-" indicated, "+" implied	
Conversion Rate	1.5/sec	3/sec
Power Requirement		
Battery Type	9V alkaline (NEDA 1604A)	
Battery Life	200hrs	
Environmental		
Oper./Storage Temp.	0 to 55°C/-40°C to 70°C	
Relative Humidity	90% to 35°C, 70% to 55°C (non-condensing)	
Temp. Coefficient	<0.1 times accuracy /°C (0 to 18°C, 28 to 55°C)	
Physical		
Case Material	high impact ABS	
Dimensions	7.1"(H) x 3.4"(W) x 1.8"(D) (18 x 9 x 5cm)	
Weight	1lb (0.5Kg)	

Specifications subject to change without notice

*Accuracy specifications given as ±(% of input + counts).
All specifications are valid for operating temperatures of 18°C to 28°C at a relative humidity up to 90% unless otherwise noted.

Digital Multimeters

360-3, 360-2

The classic look of a Simpson VOM helped build the world-wide reputation and customer loyalty which remains strong today. If you prefer traditional, rugged styling with up-to-date measurement capabilities then the Models 360-3 and 360-2 are made for you. Incorporating the latest in MOS/LSI circuitry, the 360 series has the features you need to work on today's wide range of electronic designs. Both meters have 28 or more measurement ranges with large 3.5-digit LED readouts. Fast, audible continuity checking in the 360-3 lets you keep your eyes on the job. Also in the 360-3, the diode test feature gives you "good/bad" checks of semiconductor junctions quickly and easily. The 360-2 incorporates a zero-center analog meter for tasks such as nulling, where analog indication will always be best. A unique feature in the 360-2 is the calibrated analog output which allows the input signal to be monitored on an attached chart recorder.

Models 360-3 & 360-2
- ❑ Traditional Simpson Styling
- ❑ 3.5-Digit LED Readout
- ❑ Full Measurement Capabilities
- ❑ High & Low Energy Overload Protection
- ❑ Rechargeable Batteries
- ❑ Meet ANSI C39.5-1974 Safety Specifications
- ❑ Includes Test Leads

Model 360-3
- ❑ Audible Continuity Checking
- ❑ Diode Testing
- ❑ Transient Protection
- ❑ UL 1244 Listed
- ❑ Includes Batteries

Model 360-2
- ❑ Zero-Center Analog Meter
- ❑ Analog Chart Recorder Output
- ❑ Low Power Ω Ranges

Specifications

DC Voltage

	Model 360-3	Model 360-2
Ranges	200mV, 2V, 20V, 200V, 1000V	
Max. Sensitivity	100µV on 200mV	
Max. Indication	1000V	
Accuracy*	±(0.1%+1)	±(0.25%+1)
Input Impedance	10MΩ	
Common Mode Rej.	>120dB-50/60Hz	>80dB-60Hz >100dB-DC
Normal Mode Rej.	>50dB-50/60Hz	>35dB-60Hz
F.S. Step Response	1sec	
Overload Protection	1000V (DC+ACp)	1100V (DC+ACp) (350V on 200mV, 2V)

AC Voltage

	Model 360-3	Model 360-2
Range	200mV, 2V, 20V, 200V, 750V (600V max. on 360-2)	
Max. Sensitivity	100µV on 200mV	
Max. Indication	750V	600V
Accuracy*		
200mV thru 20V	±(0.5%+2) 40Hz-1KHz ±(5.0%+2) 1-10KHz (20V range is 1KHz max.)	±(0.5%+1) 40Hz-1KHz ±(1.0%+1) 1-10KHz ±(2.0%+2) 10-20KHz
200V	±(0.5%+2) 40Hz-1KHz	±(0.5%+1) 40Hz-1KHz ±(1.0%+1) 1-10KHz ±(5.0%+2) 10-20KHz
750V (600V on model 360-2)	±(1%+3) 40-400Hz	±(0.5%+1) 40Hz-1KHz
Freq. Response	40Hz-10KHz	40Hz-20KHz
Input Impedance	10MΩ, 100pf	
Conversion Type	average	
F.S. Step Response	3sec	5sec
Overload Protection	1000V (DC+ACp)	1000V (DC+ACp)
200mV, 2V ranges	750V (DC+ACp)	350V (DC+ACp)

Resistance (Standard Power)

	Model 360-3	Model 360-2
Ranges	200Ω, 2KΩ, 20KΩ, 200KΩ, 2000KΩ, 20MΩ	2KΩ, 200KΩ, 2MΩ, 20MΩ
Max. Sensitivity	0.1Ω on 200Ω	1Ω on 2KΩ
Max. Indication	19.99MΩ	
Accuracy*		
thru 200KΩ	±(0.25%+2)	±(0.5%+1)
2000KΩ	±(0.25%+2)	±(1.0%+2)
20MΩ	±(0.75%+2)	±(1.0%+2)
Open Circuit Voltage	<3V	n/s
Full Scale Test Voltage	n/s	2V
Test Current	n/s	1mA max.
Continuity Test	on 2KΩ range, audible	n.a.
Diode Test	on 2KΩ range	n.a.
F.S. Step Response	1sec (7sec on 20MΩ)	1sec (10sec on 20MΩ)
Overload Protection	250V RMS	250V RMS (150V RMS on 2KΩ)

Resistance (Low Power)

	Model 360-3	Model 360-2
Ranges	n.a.	200Ω, 20KΩ,
Max. Sensitivity	n.a.	0.1Ω on 200Ω
Max. Indication	n.a.	19.99KΩ
Accuracy*	n.a.	±(0.5%+1)
Open Circuit Voltage	n.a.	n/s
Full Scale Test Voltage	n.a.	200mV
Test Current	n.a.	1mA max.
F.S. Step Response	n.a.	1sec
Overload Protection	n.a.	150V RMS (200Ω) 250V RMS (20KΩ)

DC Current

	Model 360-3	Model 360-2
Ranges	n.a.	20µA 200µA, 2mA, 20mA, 200mA, 2000mA, 10A
Max. Sensitivity	0.1µA on 200µA	0.01µA on 20µA
Max. Indication	10.00A	
Accuracy*		
20µA	n.a.	±(0.5%+1)
200µA thru 20mA	±(0.5%+2)	±(0.5%+1)
200mA	±(0.75%+2)	±(0.5%+1)
2A	±(0.75%+2)	±(1.0%+1)
10A	±(1.5%+2)	±(1.0%+1)
Burden Voltage (max.)	200mV 900mV on 2000mA 300mV on 200mA	220mV 100mV on 10A
F.S. Step Response	1sec	
Overload Protection	fuses-2A, 250V; 3A, 600V 10A range unfused	fuses-0.5A, 250V; 3A, 600V fuse-1/16A, 250V (Ω) 10A range unfused

AC Current

	Model 360-3	Model 360-2
Ranges	200µA, 2mA, 20mA, 200mA, 2000mA, 10A	
Max. Sensitivity	0.1µA on 200µA	
Max. Indication	10.00A	
Accuracy*		
200µA thru 20mA	±(1.0%+2) 40Hz-1KHz ±(6.0%+2) 1-10KHz	±(1.0%+1) 40Hz-10KHz
200mA	±(1.5%+2) 40Hz-1KHz ±(6.0%+2) 1-10KHz	
2A		±(2.0%+2) 40Hz-10KHz
10A	±(3.0%+2) 40Hz-1KHz	
Freq. Response	40Hz-10KHz	
Conversion Type	average	
F.S. Step Response	3sec	5sec
Burden Voltage (max.)	200mV 900mV on 2000mA 300mV on 200mA	200mV 100mV on 10A
Overload Protection	fuses-2A,250V; 3A, 600V 10A range unfused	fuses-0.5A, 250V; 3A, 600V fuse-1/16A, 250V (Ω) 10A range unfused
Isolation (DC+ACp)	1000V max. (battery only)	
(circuit to earth gnd)	300V(battery+charger)	300V(battery+charger)

Display

	Model 360-3	Model 360-2
Numeric Display	3.5-digit,0.56",LED	3.5-digit,0.43",LED
DC Polarity	"-" indicated, "+" implied	
Conversion Rate	3/sec	
Analog Meter	n.a.	50-0-50µA DC
Analog Output	n.a.	1V=1000counts

Power Requirement

	Model 360-3	Model 360-2
AC Line	120 or 230VAC	120 or 220VAC
Battery Type	(4)NiCad, AF size	(4)NiCad, C size
Battery Life	12hr before recharge	8hr before recharge

Environmental

Oper./Stor. Temp(°C)	0 to 55/-40 to 60 — 0 to 50/-40 to 60
Relative Humidity	90% to 35°C, 70% to 55°C (non-conden.)
Temp. Coefficient	<0.1 times accuracy specification to 55°C

Physical

Case Material	phenolic
Dimensions	7.2"(H) x 5.4"(W) x 3.9"(D) (18 x 14 x 10cm)
Weight	3lbs with batteries — 4lbs

Specifications subject to change without notice

*Accuracy specifications given as ±(% of input + counts).

All specifications are valid for operating temperatures of 25±1°C, at a relative humidity of 30-60%, and pressure of 575-800mmHg.

Analog Multimeters

260-8, 260-8P, 260-8RT, 260-8PRT

The consistant, widespread appeal of Simpson's 260 Series is unmatched in the industry. For over 50 years the traditional design, combining rugged reliability and excellent performance, has kept 260's on the benches of generations of engineers. The new 260-8 Series reflects Simpson's commitment to provide the best combination of quality, technology, and affordability. It also maintains compatibility with the 260's wide range of accessories and probes. The large, color coded scales make consistant, error-free readings easy to accomplish. High current output, available on the lowest resistance range, helps locate potential problem areas. Overload protection afforded by standard and high energy fusing in conjunction with a varistor protected meter movement makes the 260 able to survive the "real world". The 260-8P offers the additional conveniences of overload protection relay circuits and audible continuity checking. The new 260-8 is UL listed and continues the tradition of practicality and reliability which has made the 260 the best known VOM of all time.

Models 260-8, 260-8P, 260-8RT, & 260-8PRT

- ❑ Accuracy for the Lab, Rugged Construction for the Field
- ❑ Excellent for Adjustments such as Nulling and Peaking
- ❑ Large Color Coded Scales
- ❑ AC Frequency Response to 100KHz
- ❑ Zero RFI
- ❑ Standard and High Energy Overload Fusing
- ❑ Varistor Protected Meter Movement
- ❑ UL 1244 Listed
- ❑ Mirrored Scale
- ❑ Broad Range of Accessories and Probes
- ❑ Wide Range Capabilities
- ❑ Includes Test Leads and Batteries

Models 260-8P & 260-8PRT

- ❑ Overload Protection Relay Circuits
- ❑ Audible Continuity Checking

Specifications

DC Voltage

Ranges 250mV, 1V, 2.5V, 10V, 25V, 50V, 250V, 500V, 1000V
Sensitivity 20KΩ per volt
Accuracy 2% of full scale

AC Voltage

Ranges 2.5V, 10V, 25V, 50V, 250V, 500V, 1000V
Sensitivity 5KΩ per volt
Accuracy 3% of full scale

Resistance

Ranges	R x 1	R x 100	R x 10,000
Max. Indication	2KΩ	200KΩ	20MΩ
Center Value	12Ω	1200Ω	120KΩ
Accuracy	2.5° of arc	2° of arc	2° of arc
Open Circuit Voltage (nom.)	1.5V	1.5V	9V
Short Circuit Current (nom.)	125mA	1.25mA	75µA

DC Current

Ranges 50µA, 1mA, 10mA, 100mA, 500mA, 10A
Accuracy
50µA range: 1.5% of full scale
other ranges: 2% of full scale
Voltage Drop
50µA & 1mA ranges: 250mV
10mA & 10A ranges: 255mV
100mA range: 300mV
500mA range: 500mV

AC Current

up to 250A AC with Amp-Clamp accessory probe

Output Voltage

VAC Ranges 2.5V, 10V, 25V, 50V, 250V (limited to 350VAC)

Decibels

Range -20dB to +50dB (5 ranges)
Reference 0dB=1mW into 600Ω

Isolation

1000V (AC or DC) max. circuit to earth gnd voltage

Continuity Test (260-8P & 260-8PRT only)

Audible sound when a resistance of less than 150Ω is measured between the probes.

Meter Movement

Type taut band, self-shielding, annular, 100° arc, 4.2" length
Scales color coded, mirror backed for parallax elimination
Special Scales direct reading Amp-Clamp scales
Movement Protection varistor

Power Requirements

Battery Voltages 1.5V, 9V

Overload Protection

Models 260-8 & 260-8RT (1) 1A/250V fuse & (1) 2A/600V fuse
Models 260-8P & 260-8PRT resettable circuit breaker

Physical

Dimensions 7"(H) x 5.5"(W) x 3.1"(D), (18 x 14 x 8cm)
Weight 3lbs, (1.4Kg)

Specifications subject to change without notice

Analog Multimeters

260-6XL, 260-6XLM, 260-6XLP, 260-6XLMP

Based on the famous Model 260, the 260-6XL has extra features and extra ranges. The large viewing area with color coded scales minimizes measurement mistakes and visual confusion. The high-impact resistant case provides enhanced drop protection. Low power Ω ranges give you the ability to accurately conduct in-circuit tests without risk to components or causing digital circuits to switch states. Like the 260, the 260-6XL is UL listed for safety.

Models 260-6XL, 260-6XLM, 260-6XLP, & 260-6XLMP

- ❑ Extra Measurement Ranges
- ❑ Low Power Ω Ranges
- ❑ Zero RFI
- ❑ Extra Large Viewing Area
- ❑ Color Keyed Scales
- ❑ High Impact Case
- ❑ UL 1244 Listed
- ❑ Full Line of Accessories and Probes
- ❑ Includes Test Leads and Batteries

Models 260-6XLM & 260-6XLMP

- ❑ Mirrored Scale

Models 260-6XLP & 260-6XLMP

- ❑ Relay Overload Protection

Specifications

DC Voltage

Ranges 250mV, 1V, 2.5V, 10V, 25V, 100V, 250V, 500V, 1000V
Sensitivity 20KΩ per volt
Accuracy 2% of full scale

AC Voltage

Ranges 2.5V, 10V, 25V, 100V, 250V, 500V, 1000V
Sensitivity 5KΩ per volt
Accuracy 3% of full scale

Resistance

Ranges/Max. Indication (standard power)
R x 1/1KΩ, R x 100/100KΩ, R x 1K/1MΩ, R x 10K/10MΩ
Accuracy 2.0° of arc (2.5° of arc on R x 1)
Ranges/Max. Indication (low power)
R x 1/1KΩ, R x 10/10KΩ

DC Current

Ranges 50µA, 0.5mA, 5mA, 50mA, 500mA, 5A
Accuracy
50µA range: 1.5% of full scale
Other ranges: 2.0% of full scale
Voltage Drop
50µA, 0.5mA, 5A ranges: 50mV
5mA & 50mA ranges: 252mV
500mA range: 480mV

AC Current up to 250A AC with Amp-Clamp accessory probe.

Output Voltage

VAC Ranges all ranges thru 250VAC (0.1mf cap in series with output)

Decibels

Range -20dB to +49dB (5 ranges)
Reference 0dB=1mW into 600Ω

Meter Movement

Type taut band, self-shielding, annular, 100° arc, 4.2" length
Scales color coded, mirror backed (Models 260-6XLM & 260-6XLPM) for parallax elimination
Special Scales direct reading Amp-Clamp scales
Movement Protection varistor

Overload Protection

Models 260-6XL & 260-6XLM replaceable fuses
Models 260-6XLP & 260-6XLPM resettable circuit breakers

Physical

Dimensions 7"(H) x 5.25"(W) x 3.1"(D), (18 x 13 x 8cm)
Weight 3lbs, (1.4Kg)

Specifications subject to change without notice

Analog Multimeters

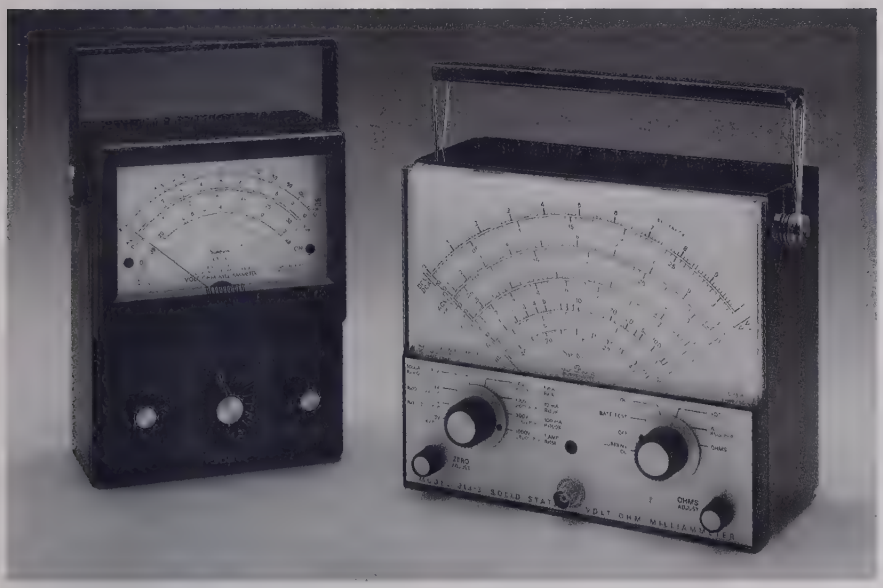
303-3XL, 313-3

High input impedance, high sensitivity, and low drift are the best descriptions of the Models 303-3XL and 313-3 FET VOM's. Designed for laboratory as well as field applications, both meters minimize the added load created by making a measurement. This characteristic can be essential when working on low power CMOS circuitry or sensitive amplifier designs. The large, easy to read scales allow precise readings to be taken. Two LED's on the 303-3XL give front panel indication of power on/off and DC polarity. The 303-3XL's low power Ω ranges allow in-circuit measurements to be made without endangering components or altering the state of digital circuits. For easy nulling adjustments, both models have a switch selectable zero center scale. The 303-3XL and 313-3 FET VOM's are traditional solutions for difficult measurements.

Models 303-3XL & 313-3
- ❑ FET Input Amplifiers
- ❑ High Input Impedance (10MΩ)
- ❑ High Sensitivity
- ❑ Zero RFI
- ❑ Extra Large Viewing Area
- ❑ Full Line of Accessories and Probes

Model 303-3XL
- ❑ Low Power Ω Ranges
- ❑ High Impact Case
- ❑ Includes Test Leads and Rechargeable NiCad Battery

Model 313-3
- ❑ Overload Protection
- ❑ Super Large 7" Scale
- ❑ Includes DC/AC/Ω Probe and Battery



Specifications

Model 303-3XL

DC & AC Voltage

Ranges 30mV, 100mV, 300mV, 1V, 3V, 10V, 30V, 100V, 300V, 1000V
DC Accuracy ±2% of full scale
AC Accuracy
50-400Hz (up to 100V): ±2% of full scale
300V 50/60Hz: ±3% of full scale
1000V 50/60Hz: ±3.5% of full scale
AC Frequency Response to 100KHz

Resistance

Ranges (low and standard power) R x 1, R x 10, R x 100, R x 1K, R x 10K, R x 100K, R x 1M **Center Value** 10Ω

DC & AC Current

Ranges 30µA, 1mA, 30mA, 1A, 10A
DC Accuracy ±2% of full scale **AC Accuracy** ±3% (50-400Hz)
AC Frequency Response to 100KHz

Decibels

Range -50dB to +62dB (10 ranges)
Reference 0dB=1mW into 600Ω

Input Impedance 10MΩ DC, 10MΩ 45pf AC

Physical

Dimensions 7.2"(H) x 5.5"(W) x 3.3"(D), (18 x 14 x 8cm)
Weight 2.5lbs, (1.1Kg)

Model 313-3

DC & AC Voltage

Ranges (DC, AC RMS) 300mV, 1V, 3V, 10V, 33V, 100V, 300V, 1000V
Ranges (AC_{p-p}) 900mV, 2.8V, 9V, 28V, 90V, 280V, 900V, 2800V
Accuracy ±3% of full scale
Frequency Response (probe switch set to AC/Ω mA)
300mV, 1V, & 3V ranges: ±0.5dB 20Hz to 100KHz
10V, 30V, & 100V ranges: ±0.5dB 20Hz to 20KHz
1000V range: flat at power line frequencies

Resistance

Ranges R x 1, R x 10, R x 100, R x 1K, R x 10K, R x 100K, R x 1M
Accuracy ±3° of arc **Center Value** 10Ω

DC Current

Ranges 100µA, 1mA, 10mA, 100mA, 1A
DC Accuracy ±3% of full scale

Decibels

Range -30dB to +62dB (8 ranges)
Reference 0dB=1mW into 600Ω

Input Impedance 11MΩ DC, 10MΩ AC

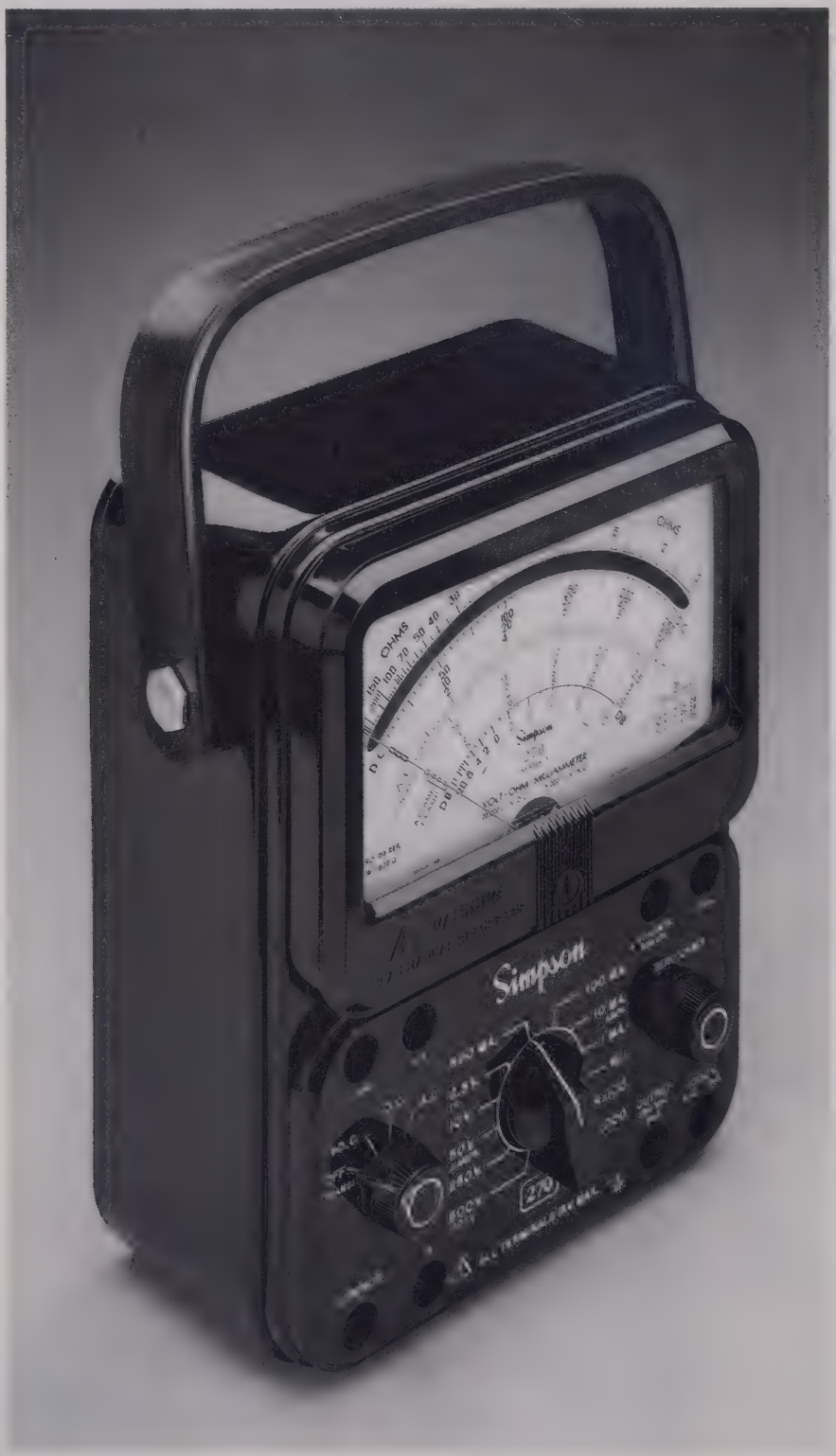
Physical

Dimensions 6.75"(H) x 7.75"(W) x 3.75"(D), (17 x 20 x 10cm)
Weight 4.5lbs, (2.1Kg)

Specifications subject to change without notice

Analog Multimeters

270-5, 270-5RT, 255, 250



Based on the design of the ever-popular Model 260 VOM, each of the Models 270-5, 255, and 250 have special characteristics which make them ideal for different applications. The 270-5 has better than a 30% improvement in voltage and resistance accuracy. To eliminate parallax errors the 270-5 includes a mirrored scale. The Model 255 VOM is specifically designed to meet the needs of heating and appliance service professionals. A calibrated +100°F to +1050°F temperature scale gives a direct readout for Type J thermocouple probes (included). The Model 250 VOM is differentiated by its low 50mV drop on all DC current ranges. This characteristic makes the 250 an ideal troubleshooting instrument for sensitive circuitry.

Models 270-5, 270-5RT, 255, & 250

- ❑ Rugged Traditional Analog Design
- ❑ Large Viewing Area
- ❑ Full Line of Compatible Accessories and Probes
- ❑ Includes Test Leads and Batteries

Models 270-5 & 270-5RT

- ❑ Extra High Accuracy
- ❑ Mirrored Scale
- ❑ UL 1244 Listed
- ❑ Varistor Protected Movement

Model 255

- ❑ Specifically Designed for Heating and Appliance Service
- ❑ Direct Display of Temperature (100 To 1050°F)
- ❑ Includes Type J Thermocouple Probe
- ❑ Appliance Testing Package Available - Includes Probes and Case

Model 250

- ❑ Low 50mV Drop for DC Current Measurements
- ❑ Ideal for Sensitive Circuits

Specifications

DC Voltage

Ranges 50mV (Model 250 only), 250mV, 1V, 2.5V, 10V, 50V, 250V, 500V (except Model 255), 1000V
Sensitivity 20KΩ per volt
Accuracy
Models 255 & 250: 2% full scale
Models 270-5 & 270-5RT: 1.25% full scale (@77°F)

AC Voltage

Ranges 2.5V, 10V, 25V, 100V, 250V, 500V (except Model 255), 1000V
Sensitivity 5KΩ per volt
Accuracy
Models 255 & 250: 3% full scale
Models 270-5 & 270-5RT: 2% full scale (@77°F)

Resistance

Ranges/Max. Indication
R x 1/2KΩ, R x 100/200KΩ, R x 10K/20MΩ
Accuracy
Models 255 & 250: 2.0° of arc (2.5° of arc on R x 1)
Models 270-5 & 270-5RT (@77°F): 1.0° of arc (1.5° of arc on R x 1)

DC Current

Ranges 50µA, 1mA, 10mA, 100mA, 500mA, 5A (except Model 255)
Accuracy
Models 255 & 250
50µA range: 1% full scale other ranges: 2% full scale
Models 270-5 & 270-5RT (@77°F)
50µA range: 0.75% full scale other ranges: 1.25% full scale

DC Current (cont.)

Voltage Drop
Models 255 & 250
50µA ranges: 250mV or 50mV (2 ranges) other ranges: 50mV
Models 270-5 & 270-5RT
50µA & 1mA ranges: 250mV 10mA & 10A ranges: 255mV
100mA range: 300mV 500mA range: 500mV

AC Current

up to 250A AC with Amp-Clamp accessory probe

Output Voltage (Models 270-5 & 270-5RT only)

VAC Ranges all ranges thru 250VAC (0.1mf cap in series with output)

Decibels

Range -20dB to +50dB (4 ranges)
Reference 0dB=1mW into 600Ω

Temperature (Model 255 only)

Range 100 to 1050°F

Meter Movement

Type taut band, self-shielding, annular, 100° arc, 4.2" length
Scales color coded, mirror backed (Models 270-5 & 270-5RT only) for parallax elimination
Special Scales direct reading Amp-Clamp scales (Models 270-5 & 270-5RT only)
Movement Protection varistor

Overload Protection

(1) 1A, 250V fuse,
(1) 2A, 600V fuse (270-5 only)

Physical

Dimensions 7"(H) x 5.25"(W) x 3.1"(D), (18 x 13 x 8cm)
Weight 3lbs, (1.4Kg)

Specifications subject to change without notice

Analog Multimeters

265, 160, 229-2, TS-111-3

Four specialized VOM designs in Simpson's broad product line are the Models 265, 160, 229-2, and TS-111-3.

Model 265 Designed for industrial situations where rugged construction and simplified controls are a necessity. A single rotary switch is used for all range selections including measurement of AC voltage and current. AC and DC currents up to a full 12A can be directly read on the scale. The 265 is compatible with the wide range of accessories and probes available for the 260 family of VOM's.

Model 160 Smallest and handiest of Simpson's analog VOM's is the Model 160. A little over 4" high, 1.75" thick, and weighing only 12 ounces, the 160 has accuracy and sensitivity similar to full size VOM's. The tough, drop resistant case and varistor protected movement make the 160 perfect for field service.

Model 229-2 Measures AC leakage currents in accordance with ANSI C101.1-1973. Whether used in product development or service, the 229-2 makes it easy to determine product conformance to standards.

Model TS-111-3 Has features and capabilities specifically suited for railroad operation. A direct readout (in percent) of the coded track pulse "on" time and a built-in pointer stop for measuring peak currents make the TS-111-3 able to quickly supply the answers which are needed. A special "power on" warning circuit is designed to prevent damage to the meter during resistance measurements. Special test leads and a tough leather carrying case are included.

Model 265
- ❑ Designed for Rugged Industrial Environments
- ❑ Simplified Single Switch Operation
- ❑ AC/DC Currents to 12A
- ❑ Measurement of AC Voltage and Current
- ❑ Industrial Testing Package Available - Includes Probes and Case

Model 160
- ❑ Smallest Size and Weight
- ❑ Accuracy Comparable to Full Size VOM's
- ❑ Tough, Shock Resistant Case
- ❑ Varistor Protected Movement

Model 229-2
- ❑ AC Leakage Testing
- ❑ Conforms to ANSI C101.1-1973
- ❑ Overload Protection

Model TS-111-3
- ❑ Designed Specifically for Railroad Measurements
- ❑ Percent "On" of Track Pulses
- ❑ Peak Current Readings
- ❑ Full Complement of Ranges
- ❑ Includes Leather Case

All Of Above Models
- ❑ Includes Test Leads and Batteries

Specifications

Model 265

DC Voltage

Ranges 300mV, 3V, 12V, 60V, 300V, 600V
Sensitivity 20KΩ per volt **Accuracy** ±2% full scale

AC Voltage

Ranges 3V, 12V, 60V, 300V, 600V
Sensitivity 5KΩ per volt
Accuracy ±3% full scale

Resistance

Ranges	R x 1	R x 100	R x 1K	R x 10K
Open Circuit Voltage	1.5V	1.5V	1.5V	7.5V
Short Circuit Current	125mA	1.25mA	125µA	72.5µA

Center Value 12Ω
Accuracy ±2% of arc

DC Current

Ranges 60µA, 1.2mA, 12mA, 120mA, 600mA, 1.2A, 12A
Accuracy ±2% full scale
Voltage Drop 250mV max.

AC Current

Ranges 120mA, 1.2A, 12A
Accuracy ±3% full scale
Voltage Drop (@ 60Hz)
120mA range: 750mV
1.2A range: 65mV
12A range: 50mV

Physical

Dimensions 7"(H) x 5.5"(W) x 3.1"(D), (18 x 14 x 8cm)
Weight 3lbs (1.4Kg)

Model 160

DC Voltage

Ranges 250mV, 1V, 2.5V, 10V, 50V, 250V, 500V, 1000V
Sensitivity 20KΩ per volt **Accuracy** ±2% full scale

AC Voltage

Ranges 2.5V, 10V, 50V, 250V, 500V, 1000V
Sensitivity 5KΩ per volt
Accuracy ±3% full scale

Resistance

Ranges R x 1, R x 10, R x 100, R x 1K, R x 10K
Center Value 30Ω

DC Current

Ranges 50µA, 1mA, 10mA, 100mA, 250mA, 500mA
Accuracy ±2% full scale

Decibels

Ranges -20dB to 10dB, -8dB to 22dB, 6dB to 36dB, 20dB to 50dB
Reference 0dB=1mW into 600Ω

Meter Movement

taut band, 100° arc, 3.0" length

Physical

Dimensions 4.6"(H) x 3.3"(W) x 1.8"(D), (12 x 8 x 5cm)
Weight 12oz (340g)

Model 229-2

AC Voltage

Ranges 150V, 300V
Input Resistance 500KΩ (150V range), 1MΩ (300V range)

AC Current

Ranges 300µA, 1mA, 3mA, 10mA
Resolution 5µA on 300µA range **Accuracy** ±3% @ 60Hz
Accuracy vs. Frequency Approximates Dalziel's "Percentile 50 Threshold of Perception Curve" within ±1.0dB
Short Test red arc: 30mA full scale, green arc: 10mA or less
Input Impedance 1500Ω 0.15mf

Overload Protection

protected up to 500V_{peak} momentary on all ranges

Physical

Dimensions 7"(H) x 5.5"(W) x 3.1"(D), (18 x 14 x 8cm)
Weight 3lbs (1.4Kg)

Model TS-111-3

DC Voltage

Ranges 600mV, 3V, 15V, 60V, 300V **Sensitivity** 1KΩ per volt
Accuracy ±2% full scale (±1% full scale on 3V range)

AC Voltage

Ranges 3V, 15V, 150V, 600V **Sensitivity** 300Ω per volt
Accuracy ±3% full scale (sine wave, AC voltages to 100V superimposed on 20% DC signal)

Resistance

Ranges R x 1, R x 100 **Center Value** 5Ω
Accuracy ±5 of reading (center scale), ±10% of reading (scale ends)

DC Current

Ranges 15mA, 60mA, 300mA, 1.5A, 6A, 30A
Voltage Drop 60mV max.

AC Current

Ranges 3A, 30A
Voltage Drop (60Hz sine wave) 90mV max. (3A range), 135mV max. (30A range)

Percent "On"

Time 0-100% (for pulses over 30 per minute)
Accuracy ±2% full scale (10-60% "on" time at 30 pulses per minute and 10-100% "on" time at 180 pulses per minute)

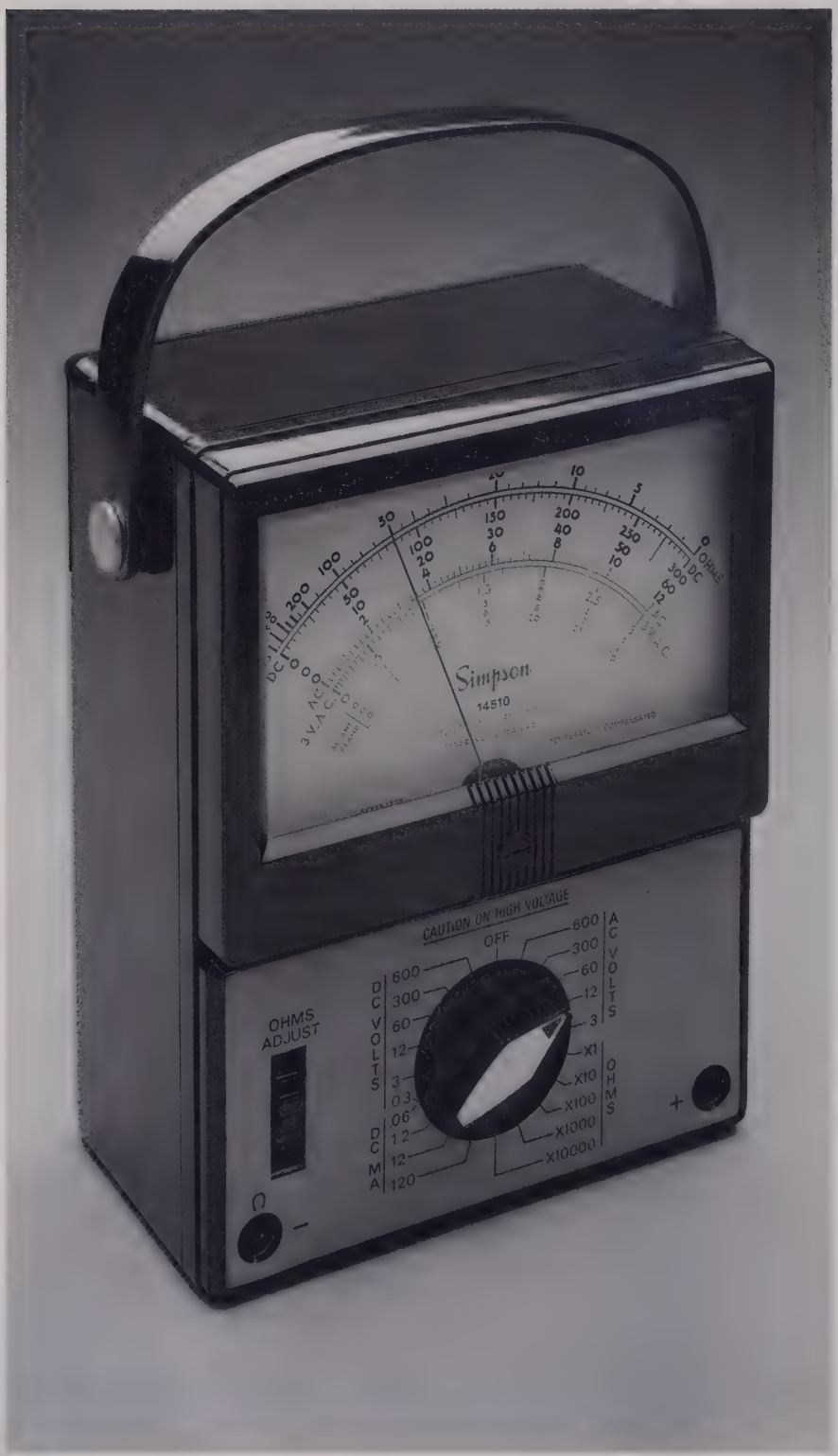
Physical

Dimensions 9.5"(H) x 6.2"(W) x 4.4"(D), (24 x 16 x 11cm)
Weight 4.3lbs (2Kg)

Specifications subject to change without notice

Analog Multimeters

14510, 8455



Designed specifically for telecommunications work, the VOM Models 14510 and 8455 are industry standards and have been for over 25 years. The 14510 has 20 ranges optimized for telephone service work combined with simplified, single knob operation. A color coded scale helps ensure that correct readings are taken. Standard and high energy fusing plus a varistor protected movement allows the 14510 to survive rough use which is normal in the field. A rugged, impact and drop resistant ABS case gives the 14510 a long life expectancy. The Model 8455 Line Loop Tester fills specialized needs in the telecommunications industry. Designed to check for line shorts, opens, and multiple ringers, the 8455 measures DC voltage and resistance. A front panel "reverse" switch is provided so that probe polarity can be quickly and easily switched during line checks.

Model 14510

- ❑ Industry Standard for 25 Years
- ❑ Measurement Ranges Optimized for Telecommunications Work
- ❑ Simplified Single Knob Operation
- ❑ Standard and High Energy Fusing
- ❑ Varistor Protected Movement
- ❑ Impact, Drop Resistant Case
- ❑ Includes Test Leads and Batteries

Model 8455

- ❑ Industry Standard for 25 Years
- ❑ Checks Line Shorts, Opens, and Multiple Ringers
- ❑ DC Voltage and Resistance
- ❑ Reverse Switch for Line Checks
- ❑ Includes Test Leads and Batteries

Specifications

Model 14510

DC Voltage

Ranges 300mV, 3V, 12V, 60V, 300V, 600V
Sensitivity 20KΩ per volt
Accuracy ±2% full scale

AC Voltage

Ranges 3V, 12V, 60V, 300V, 600V
Sensitivity 3KΩ per volt
Accuracy ±3% full scale
Frequency Response
3V & 12V ranges: 20Hz-100KHz ±1%
60V range: 20Hz-40KHz ±1%
300V range: 20Hz-10KHz ±2%
600V range: 20Hz-5KHz ±1%

Resistance

Ranges	R x 1	R x 10	R x 100	R x 1K	R x 10K
Center Value	20Ω	200Ω	2KΩ	20KΩ	200KΩ
Open Cir. Voltage (nom)	1.5V	1.5V	1.5V	1.5V	30V
Short Cir. Current (nom)	75mA	7.5mA	750μA	75μA	150μA

DC Current

Ranges	60μA	1.2mA	12mA	120mA
Voltage Drop (nom)	300mV	149mv	166mV	341mV

Accuracy ±2% full scale

Isolation 600V (AC/DC max.) circuit to earth gnd

Overload Protection replaceable fuses

Temperature Coefficient (57°F to 97°F)
±0.8% full scale (DC voltage), ±1.0% full scale (DC current), ±1.5% full scale (AC voltage)

Meter Movement self-shielding, 4.2" length, varistor protected

Battery Types (1) 1.5V NEDA-type 3F, (2) 15V NEDA-type 208

Physical

Dimensions 7"(H) x 5.3"(W) x 3.1"(D), (18 x 13 x 8cm)
Weight 3lbs (1.4Kg)
Reference temperature for specifications = 23°C to 27°C
Specifications subject to change without notice

Model 8455

DC Voltage

Range 100V
Sensitivity 1KΩ per volt
Accuracy ±2% full scale

Resistance

Ranges	R ÷ 10	R x 1
Center Value	100KΩ	1MΩ

Accuracy ±2° of arc

Open Circuit Voltage (nom)	45V	45V
Short Circuit Current (nom)	4.5mA	450μA

Isolation 100V DC max. circuit to earth gnd

Overload Protection 10mA/250V fuse all ranges

Temperature Coefficient (57°F to 97°F) ±2% FS (VDC)

Battery Type (1) Eveready #455 (45V)

Physical

Dimensions 5.5"(H) x 3.6"(W) x 2.4"(D), (14 x 9 x 6cm)
Weight 1lb (0.5Kg)
Specifications subject to change without notice

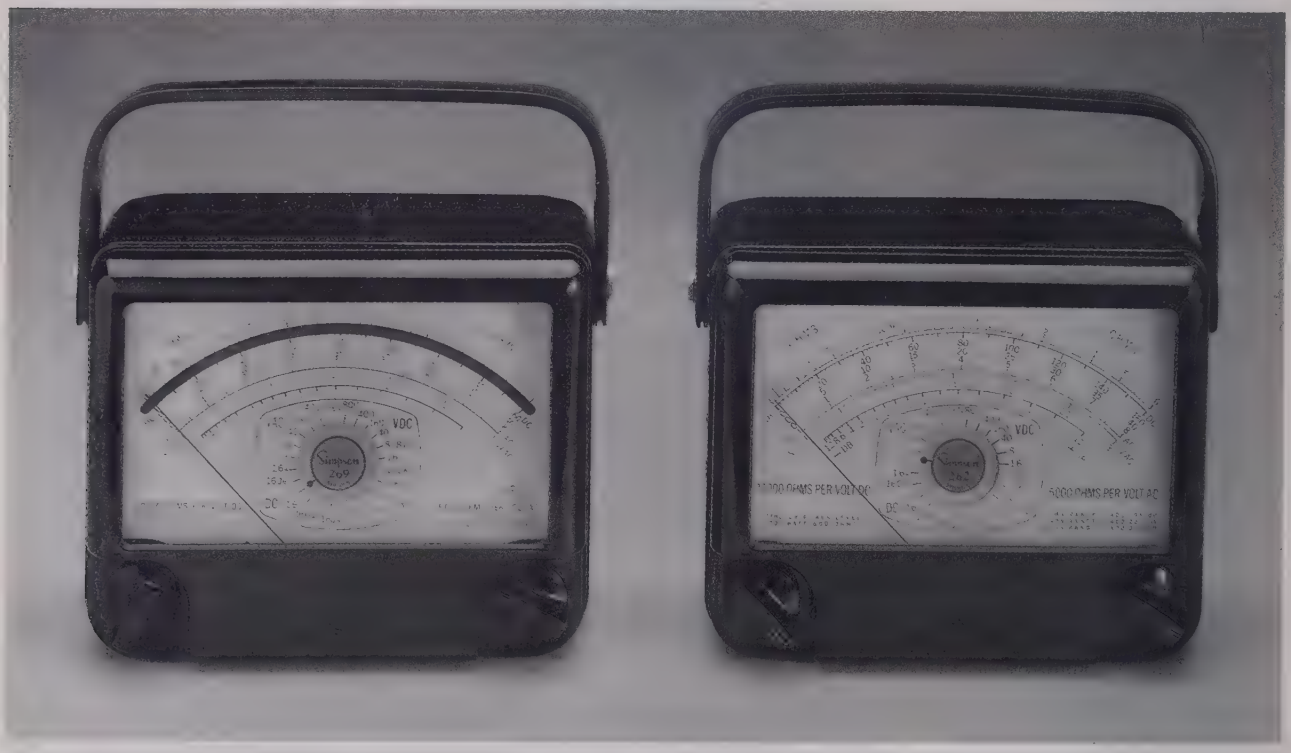
Analog Multimeters

269-3, 262-3

Ideally suited for high voltage work, the Models 269-3 and 262-3 have super high visibility 7" scales and simplified, one knob operation. DC voltages to 4000V can be directly measured using the included probe extension. High voltage 40KV DC probes are available to broaden the overall measurement range. Range indication for both models is incorporated into the center of the scale's display area. The Model 269-3 has exceptional 100KΩ/V DC sensitivity. A mirrored scale eliminates parallax error and increases the accuracy of readings.

Models 269-3 & 262-3
- ❑ Extra Large 7" Scales
- ❑ Single Knob Operation
- ❑ Direct Measurement of up to 4000V DC
- ❑ Includes Test Leads, 4KV Probe Extension, and Battery

Model 269-3
- ❑ Mirrored Scale
- ❑ 100KΩ/V DC Sensitivity



Specifications

	Model 269-3	Model 262-3
DC Voltage		
Ranges	800mV	n.a.
	1.6V, 8V, 40V, 160V, 400V, 800V, 1600V, 4000V	
Accuracy	±1.5% full scale	±2% full scale
	±3.5% (4000V range)	±3% (4000V range)
AC Voltage		
Ranges	3V, 8V, 40V, 160V, 400V, 800V	
Accuracy	±2.5% full scale	±3% full scale
Resistance		
Range/Max.Indication	R x 1 2KΩ	R x 1 500Ω
	R x 10 20KΩ	R x 10 5KΩ
	R x 100 200KΩ	R x 100 50KΩ
	R x 1K 2MΩ	R x 1K 500KΩ
	R x 10K 20MΩ	R x 10K 5MΩ
	R x 100K 200MΩ	R x 100K 50MΩ
Center Value	12Ω	4.5Ω
Accuracy	±2° of arc	±2.5° of arc

	Model 269-3	Model 262-3
DC Current		
Ranges	16µA, 160µA	80µA, 160µA
	1.6mA, 16mA, 160mA, 1.6A, 8A	
Accuracy	±1.5% full scale	±2% full scale
Decibels		
Ranges	-12dB to 45.5dB (4 ranges)	
Reference	0dB=1mW into 600Ω	
Output Ranges	Ext. 0.1mf cap. needed if DC voltages are present.	Internal 0.1mf cap. in series with all VAC ranges.
Meter Scale		
Length	6.2 inches	
Mirror Backed	yes	no
Physical		
Dimensions	6"(H) x 7.3"(W) x 3.3"(D), (15 x 19 x 8cm)	
Weight	3.3lbs (1.5Kg)	

Specifications subject to change without notice

Analog Multimeters

Micro-Testers

Simpson "Micro-Testers" offer a variety of dedicated measurement capabilities without the expense usually associated with precision instrumentation. Their small size (3" x 5.9" x 2.5") and rugged construction make them ideal for field troubleshooting, production testing, and educational institutions.

Model 372-2 Ohmmeter

Resistance ranges from 0.2Ω to 50MΩ make the 372-2 well suited to production inspection facilities.

Resistance Ranges 500Ω, 5KΩ, 50KΩ, 500KΩ, 5MΩ, 50MΩ
Center Value 5Ω on 500Ω range
Accuracy ±3° of linear arc

Model 230-3 VOM

Designed for field service, several ranges are provided to measure VDC, VAC, Ω, and DCmA.

DC Voltage Ranges 10V, 50V, 250V, 500V
AC Voltage Ranges 10V, 250V, 500V
Sensitivity (VAC, VDC) 1KΩ per volt
Accuracy ±3% FS (VDC), ±4% FS (VAC)
Resistance Ranges 1000Ω, 100Ω
Accuracy ±3° of linear arc from absolute value of measurement
DC Current Ranges 10mA, 50mA, 250mA

Model 390-2 Wattmeter

Working on appliances is made easier using the 390-2's ranges for voltage (AC & DC), AC current, and AC power.

Voltage Ranges (DC & AC) 150V, 300V
AC Current Ranges 3A, 15A
Power Ranges (50-133Hz) 300W, 600W, 1500W, 3000W
Accuracy ±5% full scale

Model 392 Wattmeter

Two meter movements provide simultaneous measurement of voltage and power.

Voltage Ranges (DC & AC) 130V, 260V
Power Ranges 1000W, 5000W
Accuracy ±3% full scale, ±5% full scale (VDC)
Frequency 50/60Hz or DC

Model 362-2 Low Ohmmeter

Providing highly accurate readings from 0.1Ω to 25Ω, the 362-2 is designed for locating shorts in windings and checking switch/relay resistance.

Resistance Ranges 5Ω, 25Ω
Accuracy ±3° of linear arc

Model 370 AC Ammeter

Using its built-in current transformer, the 370 can quickly check AC line loads from 1A to 25A.

AC Current Ranges 1A, 2.5A, 5A, 10A, 25A
Accuracy ±3% full scale

Model 371 AC Voltmeter

AC line voltages up to 600V can be simply determined using the 371's three ranges.

AC Voltage Ranges 150V, 300V, 600V
Sensitivity 167Ω per volt
Accuracy (50/60Hz) ±3% full scale

Model 373 DC Milliammeter

Useful in a variety of situations, the 373 has nine ranges spanning 1mA to 1A.

DC Current Ranges 1mA, 5mA, 10mA, 25mA, 50mA, 100mA, 250mA, 500mA, 1A
Accuracy ±3% full scale

Model 374 Microammeter

Currents from 50μA full scale to 1mA full scale can be measured with ability to quickly short the inputs via a front panel switch.

DC Current Ranges 50μA, 100μA, 250μA, 500μA, 1mA
Accuracy ±3% full scale

Model 375 DC Ammeter

Checking power supply outputs can be done without shunts using the 1A to 25A scales on the 375.

DC Current Ranges 1A, 2.5A, 5A, 10A, 25A
Accuracy ±3% full scale

Model 376 AC Voltmeter

The 376 measures average AC voltages up to 1000V.

AC Voltage Ranges 5V, 10V, 25V, 50V, 100V, 250V, 500V, 1000V
Sensitivity 1000Ω per volt
Accuracy ±3% full scale

Model 377-2 DC Voltmeter

The 377-2 measures DC voltages up to 1000V.

DC Voltage Ranges 1V, 2.5V, 5V, 10V, 25V, 50V, 100V, 250V, 500V, 1000V
Sensitivity 1000Ω per volt
Accuracy ±3% full scale

Model 379 Battery Tester

DC voltage ranges on the 379 are optimized for testing a wide range of batteries from 1.5V to 90V.

DC Voltage Ranges 1.5V, 4.5V, 6V, 7.5V, 9V, 15V, 22.5V, 30V, 45V, 67.5V, 90V
Load Resistance within ±5%

Model 387 Millivoltmeter

Designed to check appliance thermocouples (furnaces, hot water heaters, refrigerators etc.).

DC Voltage Ranges 10mV, 30mV, 100mV, 300mV, 1V
Sensitivity 750μA at full scale
Accuracy ±3% full scale

Specifications subject to change without notice

Micro-Ohmmeters

444, 1699

Development and production of many of today's advanced components require the ability to accurately measure resistances well below the normal range of general purpose instruments. The high precision Model 444 Micro-Ohmmeter and the Model 1699 Milli-Ohmmeter fill this specialized requirement. The 4.5-digit Model 444 is ideally suited for difficult tests in which a high level of accuracy is a necessity. Your choice of measurement method is selected with front switches. Standard "DC" resistance checks can be made with the probes set to either polarity. The special "AC" resistance calculation uses a 40Hz square wave for the test voltage. Low test voltages of the 444 (100μV max.) greatly reduce the chance that oxidation, corrosion, and contamination will be "punched through", resulting in false readings. Used in production situations, the 444's audible tone can be used to indicate resistance values below any selected reading. With a resolution of 1μΩ, the 444 has the performance necessary for the most demanding jobs. The analog Model 1699 is designed to economically measure resistances down to 0.5mΩ (50mΩ full scale). The 1699 is able to achieve its excellent 1% accuracy by comparing measured resistance values to internal resistance standards. Both the Models 444 and 1699 have built-in batteries for portable use.

Model 444

- ❑ 4.5-Digit/20,000 Count LCD Readout
- ❑ Max. Resolution of 1μΩ
- ❑ 100μV Max. Test Voltage to Eliminate "Punch Through"
- ❑ 5mA Max. Test Current
- ❑ Two Measurement Methods
  "DC" Mode with Selectable Polarity
  "AC" Mode — 40Hz Square Wave
- ❑ 120 or 220VAC
- ❑ Includes Kelvin Clip Leads and Rechargeable Batteries

Model 1699

- ❑ Economical Low Resistance Meter
- ❑ Analog Display
- ❑ 0.5mΩ Max. Resolution
- ❑ Battery Operated
- ❑ Includes Test Leads and Batteries

Specifications

Model 444

Resistance

Ranges	20mΩ	200mΩ	2Ω	20Ω
Max. Sensitivity	1μΩ	10μΩ	100μΩ	1mΩ
Max. Test Current	5mA	500μA	50μA	5μA

Accuracy
AC (Pulse) Mode: ±(0.05% of input + 15 counts)
DC Mode: ±(0.1% of input + 150 counts)
Battery Voltage Effect: ±(0.15% of input) fully charged down to low battery "B" indication
Max. Test Voltage 100μV peak
Measurement Techniques
AC (Pulse) Mode: 40Hz square wave
DC Mode: switchable polarity DC

Audio Alarm

Operation Resistance value below setpoint activates audio beeper and display annunciator. Measured values above the setpoint activate display annuciator.
Setpoint Adjustment front panel knob
Accuracy ±(1% of input + 100 counts) **Hysterisis** 1% typical
Adjustment Range 1 to 20,000 counts
Isolation 30V RMS max. input terminals to gnd

Display

Numeric Display 19,999 count, 0.5" LCD with "▲▼", "AC", and "DC" annunciators
Conversion Rate 1 per second nominal

Power Requirements

AC Line 120VAC ±10%, 240VAC optional, 3VA typical
Battery Type rechargeable NiCad **Battery Life** 8 hours typical
Test Leads BNC to Kelvin clip (2 leads) RG-58 cable

Environmental

Operating Temperature 0°C to 50°C
Storage Temperature -40°C to 60°C
Relative Humidity 90% max. to 35°C, 70% max. to 50°C (non-cond.)
Temperature Coefficient 0.1 times accuracy specification per °C (0°C to 18°C and 28°C to 50°C)

Physical

Dimensions 2.7"(H) x 9.0"(W) x 8.4"(D), (7 x 23 x 21cm)
Weight approx. 3lbs (1.4Kg)
All specifications are valid for operating temperatures of 18°C to 28°C at a relative humidity up to 80% unless otherwise noted.

Model 1699

Resistance

Ranges							
0.05Ω	0.1Ω	0.25Ω	0.5Ω	1Ω	5Ω	10Ω	50Ω
Max. Test Current (mA)							
460	231	97	47	26.5	5.0	2.7	0.5
Max. Power Dissipation (mW)							
7.95	5.16	2.15	1.10	0.694	0.121	0.069	0.012

Max. Sensitivity 0.0005Ω **Accuracy** ±1% full scale
Meter Scale 7" single arc, 90°, 100-div., mirror, knife-edge pointer

Inputs

Test Leads hardwired Kelvin type clip

Power Requirements

Battery Types (1) NLM, (1) NEDA #1604 (included)

Physical

Dimensions 7.4"(H) x 11.4"(W) x 3.3"(D), (19 x 29 x 8cm)
Weight 5.6lbs (2.5Kg)
Specifications subject to change without notice

Universal Frequency Counters

714, 713, 712

With accuracy and versatility designed to satisfy professional engineers, the Models 712, 713, and 714 Frequency Counters cover the complete range from audio signals to RF communications. Presenting an excellent mix of measurement sophistication and ease-of-use, the new Professional Series is ideally suited for bench-top design engineering and service work. Preprogrammed self-check routines are built into each counter to verify functionality. Adjustable trigger controls on inputs make it a simple matter to compensate for analog as well as digital signal levels. The Model 714 goes one step further by including input attenuation settings and selectable input coupling. Built-in low pass filters eliminate high frequency noise to increase measurement accuracy. For complex situations involving two interdependent frequencies, an external clock signal can be substituted for the normal internal oscillator. Direct readout of frequency ratios, time intervals, period, and totalized counts can be chosen to give you insight into the relationships between two signals and their behavior over time.

- ❑ Frequency
  - 1.3GHz—**Model 714**
  - 520MHz—**Model 713**
  - 200MHz—**Model 712**
- ❑ Period
- ❑ Time Interval
- ❑ Frequency Ratio
- ❑ Count Totalizing
- ❑ Variable Triggering
- ❑ 8-Digit Display
- ❑ Built-In Self Check
- ❑ Low Pass Filter

Specifications

Models	714	713	712
Inputs			
Ranges			
AC Coupled			
Ch.A	10Hz-100MHz		10Hz-200MHz
Ch.B	10Hz-2.5MHz		
Ch.C	100MHz-1.3GHz	100-520MHz	n.a.
DC Coupled			
Ch.A	DC-100MHz	n.a.	
Ch.B	DC-2.5MHz	n.a.	
Sensitivity			
Ch.A	25mVrms (to 10MHz)		
	50mVrms (10-100MHz)		
	n.a.		100mVrms (100-200MHz)
Ch.B	25mVrms (10Hz-2.5MHz)		
Ch.C	15mVrms (100-800MHz) 20mVrms (800-1000MHz) 30mVrms (1-1.2GHz) 50mVrms (1.2-1.3GHz)	100mVrms (100-520MHz)	n.a.
Coupling (A & B)	AC/DC	AC	
Attenuation (A & B)	x1, x10	n.a.	
Low Pass Filter			
Ch.A	-3dB at 150KHz		
Impedance			
Ch.A & Ch.B	1MΩ, 30pf		
Ch.C	50Ω		n.a.
Max. Input Voltage			
Ch.A & Ch.B	120Vrms		
Ch.C	3Vrms		n.a.

Frequency

Ranges			
Ch.A	DC-10MHz (direct)	10Hz-10MHz (direct)	
	10-100MHz (prescaled by 10)		
	n.a.		100-200MHz (prescaled by 100)
Ch.C	100MHz-1.3GHz (prescaled by 256)	100-520MHz (prescaled by 100)	n.a.
Gate Times			
Ch.A	0.01, 0.1, 1.0, 10sec (direct)		
	0.1, 1.0, 10sec (prescaled by 10)		
	n.a.		1.0, 10sec (prescaled by 100)
Ch.C	0.0256, 0.256, 2.56sec (pre-scaled by 256)	1.0, 10sec (prescaled by 100)	n.a.
Resolution			
Ch.A	0.1, 1, 10, 100Hz (direct)		
	1, 10, 100Hz (prescaled by 10)		
	n.a.		10, 100Hz (prescaled by 100)
Ch.C	0.1, 1, 10KHz (prescaled by 256)	10, 100Hz (prescaled by 100)	n.a.
Accuracy	±1 count ± time base error x frequency		

Specifications subject to change without notice

Models	714	713	712
Period (Channel A)			
Ranges	1Hz-2.5MHz	10Hz-2.5MHz	
Period Average	selectable, x1, x10, x100, x1000		
Resolution	0.1nsec, 1nsec, 10nsec, 100nsec		
Accuracy	±1 count ± trigger error ± time base error x period		
Frequency Ratio (Ch.A ÷ Ch.B)			
Ranges			
Ch.A	10Hz-10MHz		
Ch.B	10Hz-2.5MHz		
Resolution	±1 count ± (B trigger error x frequency A)/N where N=1, 10, 100, 1000		
Accuracy	±1 count ± (B trigger error x frequency A)/N where N=1, 10, 100, 1000		
Time Interval (Ch.A to Ch.B)			
Range	0.5-200,000µsec		
Sensitivity	1Vpeak at minimum pulse width of 0.5µsec		
Time Interval Ave.	selectable, x1, x10, x100, x1000		
Resolution	0.1nsec, 1nsec, 10nsec, 100nsec		
Accuracy	±1 count ± A trigger error ± B trigger error ± time base error x time interval		
Totalize (Ch.A)			
Range	DC-10MHz	10Hz-10MHz	
Resolution	±1 count of input		
Time Base			
Frequency			
Ch.A & Ch.B	10MHz		
Ch.C	3.90625MHz	10MHz	n.a.
Temperature Stability	±1ppm, 0-40°C	±10ppm, 0-50°C	
Aging	±1ppm per year	±5ppm per year	
External Oscillator	1-10MHz, 2.5-3V		
Self-Check	Checks and displays the internal time base oscillator frequency (10MHz).		
Display			
Numerical	8-digit, 0.56" orange LED		
Annuciators	overflow, gate, KHz, MHz (714 only), µsec		
Environmental			
Oper. Temp.	0° to 40°C	0° to 50°C	
Stor. Temp.	-40° to 70°C		
Power Requirements			
AC Line	120/220VAC, ±10%, 20VA		
Physical			
Dimensions	3.9"(H) x 9.9"(W) x 10.5"(D), (10 x 25 x 27cm)		
Weight	approx. 4.3lbs, (2Kg)		

Frequency Counters

711

Economical, compact, and easy to use, the Model 711 Frequency Counter is well suited for field service or production test stations. Frequency measurements from 10Hz to 80MHz are displayed with 6-digit resolution. High frequency noise can be easily eliminated via a pushbutton activated low pass filter. Operation could not be simpler — two buttons control the frequency ranges and a third switches in the low pass filter. For quick verification or adjustment of clock signals and oscillators, nothing can get the job done faster or easier than the 711.

- ❑ Economical
- ❑ Easy to Use, Three Button Operation
- ❑ 10Hz-80MHz Frequency Range
- ❑ 6-Digit Resolution
- ❑ Very Compact & Portable

Specifications

Input

Ranges 10Hz-80MHz
Sensitivity 50mV$_{rms}$ (10Hz-60MHz), 100mV$_{rms}$ (60-80MHz)
Coupling AC
Low Pass Filter -3dB at 1MHz
Impedance 1MΩ, 30pf
Max. Input Voltage 240V peak (10Hz-100KHz). Derated to 100V peak at 1MHz, 15V peak (60-80MHz).

Frequency

Range 10Hz-80MHz
Gate Time 10msec (100Hz resolution), 1sec (1Hz resolution)
Accuracy ±1 count ± time base accuracy

Time Base

Frequency 6.5536MHz
Temperature Stability ±10ppm max. (0° to 45°C)
Aging ±5ppm max. per year
Line Voltage Stability Effect ±1ppm for ±10% line voltage variation

Display

Numerical 6-digit, 0.3" LED
Conversion Rate 5 samples per second (MHz range), 2 seconds per sample (Hz range)

Environmental

Operating Temperature 0° to 45°C
Storage Temperature -40° to 70°C

Power Requirements

AC Line 120VAC ±10%, 230VAC ±15% (optional), 50Hz/60Hz/400Hz, approx. 5VA

Physical

Dimensions 2"(H) x 5.6"(W) x 4.6"(D), (5 x 14 x 12cm)
Weight approx.12oz (340g)

Specifications subject to change without notice

Microwave Leakage Tester

380M

The safety of consumer microwave ovens and a wide range of microwave based industrial ovens and dryers depend on the integrity of the enclosure and door seals. Simpson's Model 380M Microwave Leakage Tester gives you the ability to quickly determine whether the microwave leakage exceeds Federal safety standards. The 380M is battery operated and is as well suited for on-site inspections as it is for use on a production line. Four measurement ranges give direct readout of power density (mW/cm²) using the included non-polarized probe. Designed to withstand years of use, the Simpson 380M is built into a rugged, shock resistant housing and comes with a foam filled carrying case.

- ❑ Measures 2,450MHz Microwave Radiation
- ❑ Direct Readout of Power Density on Four Ranges
- ❑ Portable, Battery Operated
- ❑ Includes Non-polarized, Wide Range Probe, Foam Spacer, Batteries and Carrying Case

Specifications

Power Density

Power Density Ranges (mW/cm²) 2.5, 10, 25, 100
Calibration Frequency 2450MHz ±10MHz
Accuracy ±1dB
Response Time
FAST Setting: 1.2sec maximum
SLOW Setting: 3.0sec maximum
Scales linear, 0-2.5 and 0-10
Probe Time Constant 0.5sec
Probe Power Density Range 0-100mW/cm²
Probe Overload Rating 300mW/cm² maximum

Power Requirements

Battery Type (2) 9V NEDA 1604 (included)
Battery Life 400hrs minimum

Environmental

Operating Temperature 10° to 40°C
Storage Temperature -40° to 60°C (battery removed)
Temperature Coefficient ±0.057dB per 10°C

Physical

Case Construction electrically shielded, high-impact, separate battery compartment
Tripod Mounting 1/4-20 threaded insert
Dimensions
Instrument: 8.2"(H) x 3"(W) x 1.9"(D), (21 x 8 x 5cm)
Probe: 11"long x 0.75"diameter, (28 x 2cm)
Probe Cable: coiled - 6", (15cm), uncoiled - 43", (109cm)
Weight 0.8lb, (364g)

Specifications subject to change without notice

Sweep/Function Generators

423

Whether you need complex waveforms to test analog circuitry or square waves of a precise frequency to drive digital systems, the 423 has the capabilities to handle the job. Standard functions (sine, square, triangle, and TTL) are output with excellent stability and low distortion up to 13MHz. Linear and logarithmic frequency sweeps are easily generated using the digital readout to set the sweep width. The exceptional sweep range (10,000:1 logarithmic) is very helpful for analyzing the dynamic performance of wide band amplifiers. Sweeps can be triggered (manual or external) for situations requiring specific sweep timing. The 423 also includes the ability to create AM and FM signals with internal or external control of the modulation parameters. Burst, gated, and triggered gated outputs are available with manual or external trigger control. While the front panel 6-digit display is used to accurately control output frequency, it also doubles the versatility of the 423 by functioning as a general purpose 80MHz frequency counter. The 423 is truly a multipurpose benchtop instrument incorporating features to help you do your job faster and easier.

- ❑ Sine, Square, and Triangle Outputs to 13MHz
- ❑ Variable DC Offset, Symmetry, and Amplitude
- ❑ 1,000:1 Linear Sweeps
- ❑ 10,000:1 Logarithmic Sweeps
- ❑ Variable Sweep Width and Rate
- ❑ Continuous and Single Shot Sweeps, Burst and Gated Outputs
- ❑ Internally or Externally Controlled AM and FM Modulation
- ❑ Independent Auxiliary Output to 100KHz
- ❑ Built-In 6-Digit, 80MHz Frequency Counter (Internal & External)
- ❑ High Visibility LED Readout

Specifications

Waveform Outputs

Waveforms sine, triangle, square, DC, and TTL (separate BNC)
Frequency Range 0.005Hz-13MHz (7 ranges)
Max. Output Amplitude $10V_{p-p}$ into 50Ω, $20V_{p-p}$ into 1MΩ
Output Amplitude Control continuously variable: 0 to -30dB, fixed attenuation: 0 or -30dB
Amplitude Flatness ±0.1dB to 20KHz, ±0.3dB to 500KHz, ±2dB to 13MHz
DC Offset adjustable: ±10V into 1MΩ, ±5V into 50Ω
Output Impedance 50Ω
Sine Wave Distortion <1% (1Hz-1MHz)
Sine Wave Harmonic Distortion better than -30dB (to 13MHz)
Triangle Wave Non-linearity <1% (up to 200KHz)
Time Non-symmetry <0.5% (up to 50KHz), <1% (up to 200KHz), <10% (up to 13MHz)
Symmetry Adjustment 20% to 80%
Square Wave Rise/Fall Time <20nsec
Square Wave Aberration <5%
VCF Range 1000:1 (from upper end of frequency range)
TTL Output fixed amplitude, TTL compatible, up to 10 TTL loads
TTL Rise/Fall Time <25nsec
Sweep Range 1,000:1 linear, 10,000:1 logarithmic
Sweep Time 0.001sec to 100sec
Sweep Modes free running, external trigger (TTL), manual trigger
Output Control CW, burst (manual or external), gate (external), triggered gate (manual or external)
Modulation Types AM and/or FM
Modulation Source internal or external
Modulation Frequency Range 10Hz to 100KHz
Modulation Index 0 to 100% with internal source
Auxiliary Generator Output Waveform triangle
Auxiliary Frequency Range 10Hz to 100KHz
Auxiliary Output Impedance 600Ω
Auxiliary Symmetry Adjustment 10% to 90%

Frequency Counter

Time Bases 10sec, 1sec, 0.1sec, 0.01sec
Time Base Accuracy ±10ppm
External Counter Input up to 80MHz
Counter Resolution 0.1Hz (10sec range), 1Hz (1sec range), 100Hz (0.1sec range), 1KHz (0.01sec range)
Counter Accuracy ±(1 count + (time base accuracy x frequency))
Display 6-digit, 0.3" LED

Stability

Temperature (after 30 min. warm-up) ±0.1% per °C (frequency), ±0.05dB per °C (amplitude)
Line Voltage ±0.1% per ±10VAC variation (frequency), ±0.05dB per ±10VAC variation (amplitude)

Power Requirements

AC Line 120/220 VAC ±10%, 50/60Hz, 24VA

Environmental

Operation Temperature 0° to 50°C
Storage Temperature -10° to 60°C

Physical

Dimensions 3.9"(H) x 9.9"(W) x 10.5"(D), (10 x 25 x 27cm)
Weight approx. 4.5lbs, (2Kg)

Specifications subject to change without notice

Sweep/Function Generators

422, 421

Affordability with advanced features make the new Models 421 and 422 Professional Series Function Generators able to expand your test capabilities without expanding your budget. In addition to the standard functions (sine, square, triangle, TTL, and DC) the 421 and 422 let you analyze the performance of amplifiers and filters using swept frequency waveforms. Start frequency, stop frequency, and sweep rate are easily selected up to the maximum output frequency of 5MHz. Incorporating both linear and logarithmic sweeps, you can look at circuits having nonlinear characteristics and use the signal which best illustrates the detail in question. Front panel buttons select continuous, burst, or single sweep outputs. The Model 422 goes one step further with the inclusion of a frequency counter capable of testing internal or external signals from DC to 80MHz. The frequency counter's 6-digit LED readout makes it easy to control the output frequency to an exceptional level of accuracy. Whether you are involved in product design or factory service, the carefully designed features and reliable performance of the new Professional Series Function Generators will quickly make them one of the most routinely used instruments on your bench.

Models 422 & 421

- ❑ Sine, Square, and Triangle Outputs to 5MHz
- ❑ Variable DC Offset, Duty Cycle, and Amplitude
- ❑ 100:1 Linear Sweeps
- ❑ 1000:1 Logarithmic Sweeps
- ❑ Variable Sweep Width and Rate
- ❑ Continuous and Single Shot Sweeps, Burst

Model 422

- ❑ Built-In 6-Digit Frequency Counter (Internal & External)
- ❑ High Visibility LED Readout

Specifications

Waveform Outputs

Waveforms sine, triangle, square, DC, and TTL (separate BNC)
Frequency Range 0.05Hz-5MHz (7 ranges)
Max. Output Amplitude $10V_{p-p}$ into 50Ω, $20V_{p-p}$ into 1MΩ
Output Amplitude Control continuously variable: >30dB, fixed attenuation: 0 or -30dB
DC Offset adjustable ±10V into 1MΩ
Output Impedance 50Ω ±5%
Frequency Accuracy
Dial Calibration (Model 421): ±10% full scale overall
Counter Display Accuracy (Model 422): ±1 count ± 10ppm x frequency
Sine Wave Distortion <1% (0.05Hz-100KHz, $10V_{p-p}$ into 50Ω)
Sine Wave Harmonic Distortion better than -24dB (100KHz-5MHz)
Triangle Wave Non-linearity <1% (up to 100KHz)
Triangle Wave Non-symmetry <1% (up to 100KHz)
Square Wave Rise/Fall Time <100nsec, 60nsec typical
Square Wave Non-symmetry <1% (up to 100KHz)
Square Wave Aberration <3%
VCF Range 1000:1 (from end of frequency range)
TTL Output fixed amplitude, TTL compatible, up to 10 TTL loads
TTL Rise/Fall Time 25nsec
Sweep Range 100:1 linear, 1000:1 log
Sweep Time 0.05-30sec
Trigger Modes free running, external trigger (TTL), manual
Amplitude Flatness ±0.1dB (to 20KHz), ±0.3dB (20KHz-5MHz), sine wave

Frequency Counter (Model 422 Only)

Time Bases 10sec, 1sec, 0.1sec, 0.01sec (manually selected)
External Counter Input 0Hz-80MHz, 100mV minimum
Counter Resolution 0.1Hz (10sec range), 1Hz (1sec range), 100Hz (0.1sec range), 1000Hz (0.01sec range)

Stability

Temperature (after 30 min. warm-up) ±0.1% per °C (frequency), ±0.05dB per °C (amplitude)
Line Voltage ±0.1% per ±10VAC variation (frequency), ±0.05dB per ±10VAC variation (amplitude)

Power Requirements

AC Line 120/220 VAC ±10%, 50/60Hz, 24VA

Environmental

Operation Temperature 0° to 50°C
Storage Temperature -10° to 60°C

Physical

Dimensions 3.9"(H) x 9.9"(W) x 10.5"(D), (10 x 25 x 27cm)
Weight approx. 4.3lbs, (2Kg)

Specifications subject to change without notice

Function Generators

420

The Model 420 Function Generator offers all basic output functions in a compact, battery operated design. Sine, square, triangle, and TTL outputs can be generated up to a maximum frequency of 1MHz. Continuously variable DC voltage offsets up to ±10V can be added to any selected waveform. An input is provided so that external voltages can be used to control the output frequency and create swept signals. Two versions of the 420 offer a choice of power inputs. The 420A must be connected to AC line power during operation. The 420D has the additional feature of rechargeable NiCad batteries, allowing it to be used up to 8 hours in locations where AC power is not available or is inconvenient. This feature alone makes the 420 a wise choice for general purpose field service applications.

- ❑ Sine, Square, Triangle, & TTL
- ❑ 0.1Hz To 1MHz Output
- ❑ Variable DC Offset
- ❑ Input For Voltage Controlled Frequency Sweeping
- ❑ Rechargeable Batteries ("D" Versions Only)
- ❑ 120/240 VAC

Specifications

Waveform Outputs

Waveforms sine, triangle, square, DC, and TTL (separate BNC)
Frequency Range 0.1Hz-1MHz (7 ranges)
Max. Output Amplitude 10Vp-p into 600Ω, 20Vp-p open circuit
Output Amplitude Control continuously variable >30dB, fixed attenuation: 0 or -31dB
DC Offset adjustable with OFF position, ±5V into 600Ω, ±10V open circuit (max. 14V + VDC without clipping)
Output Impedance 600Ω ±5%
Frequency Accuracy ±5% full scale overall dial accuracy
Sine Wave Distortion <1% (1Hz-100KHz), <2% (100KHz-1MHz)
Triangle Wave Non-linearity <1% (up to 100KHz)
Triangle Wave Non-symmetry <1% (up to 100KHz)
Square Wave Rise/Fall Time <100nsec into 600Ω, 20pf
Square Wave Non-symmetry <1% (up to 100KHz)
Square Wave Aberration <3%
VCG Range >300:1 with 0 to -5V external signal (1000:1 capability)
VCG Input ±20V maximum, 2KΩ input impedance, frequency decreases from dial setting with negative voltage applied
TTL Output fixed amplitude, TTL compatible, up to 10 TTL loads
TTL Rise/Fall Time <25nsec
Amplitude Flatness ±0.1dB (to 20KHz), ±0.3dB (20KHz-1MHz), sine wave

Stability

Temperature (after 15 min. warmup) ±0.1% per °C (frequency), ±0.05dB per °C (amplitude)
Line Voltage ±0.1% per ±10VAC variation (frequency), ±0.05dB per ±10VAC variation (amplitude)

Power Requirements

AC Line 120/240 VAC ±10%, 50/60Hz, 6VA
Battery Type (Model 420D only) (4) "C" size NiCad rechargeable batteries (not included)
Battery Life (Model 420D only) 8 hours for full charge

Environmental

Operation Temperature 0° to 50°C
Storage Temperature -10° to 60°C

Physical

Dimensions 2.7"(H) x 8.4"(W) x 9.0"(D), (7 x 21 x 23cm)
Weight Model 420A: approx. 3lbs, (1.4Kg), Model 420D: 4lbs, (1.8Kg)

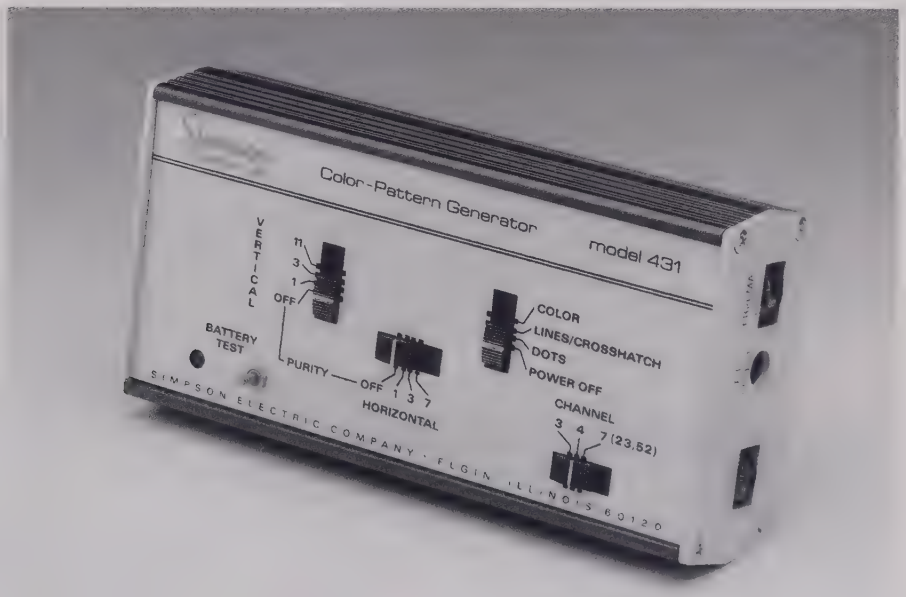
Specifications subject to change without notice

Color Pattern Generator

431

Easily a performance vs. price leader, the Model 431 Chroma-line Color Pattern Generator enables you to conduct 13 different tests on color and black and white television sets while displaying any of 28 patterns. Although weighing only 13 ounces, the 431 has 3 VHF and 2 UHF channels with a crystal controlled chroma subcarrier oscillator for excellent frequency stability. Both chroma and RF output levels are adjustable via side panel knobs. Both easy to use and completely portable, the 431 is an essential tool for television adjustments and repair.

- ❑ Economical yet Powerful
- ❑ Compact, Battery Operated
- ❑ 13 Tests with 28 Patterns
- ❑ 3 VHF, 2 UHF Channels
- ❑ Adjustable Outputs
- ❑ Digital Countdown Chains
- ❑ High Stability Chroma Subcarrier
- ❑ Includes Cables and Battery



Specifications

RF Output

Frequency Ch.3 (61.25MHz), Ch.4 (67.25MHz), Ch.7 (175.25MHz), Ch.23 and 52 (3rd and 5th overtones of Ch.7 respectively). Ch.3, 4, and 7 are LC controlled.
Frequency Accuracy ±0.02% at reference conditions (all channels)
Frequency Tolerance ±0.15% over temperature range (all channels)
Impedance 75Ω (all channels)
Level adjustable to approx. 20mV (all channels)

Chroma Offset Carrier

Frequency 3.563795MHz, crystal controlled
Frequency Accuracy ±0.001% at reference conditions
Frequency Tolerance ±0.01% over temperature range
Level adjustable from 0 to 200%

Master Clock

Frequency 378.0KHz, ceramic resonator controlled
Frequency Accuracy ±0.005% at reference conditions
Frequency Tolerance ±0.1% over temperature range

Test Patterns

Total Number 28
Color ungated rainbow
Color Bars
Three Bars: gated, spaced at 90°, 180°, and 270° phase intervals from burst, R-Y / B-Y / -(R-Y)
Ten Bars: gated, spaced at 30° phase intervals from burst
Horizontal Lines 1, 3, or 7
Vertical Lines 1, 3, or 11
Cross Hatch 1x1, 1x3, 1x7, 3x1, 3x3, 3x7, 11x1, 11x3, 11x7
Dots 1x1, 1x3, 1x7, 3x1, 3x3, 3x7, 11x1, 11x3, 11x7
Blank Raster purity, white, no noise (sync modulation only)

Environmental

Reference Temperature 25°C ±5°C ambient
Reference Relative Humidity 60% ±15%
Operating Temperature 0° to 50°C
Storage Temperature -40° to 70°C

Power Requirements

Battery Type (1) 9V alkaline, NEDA 1604A

Physical

Dimensions 3.2"(H) x 6.3"(W) x 1.4"(D), (8 x 16 x 4cm)
Weight 13oz, (370g)

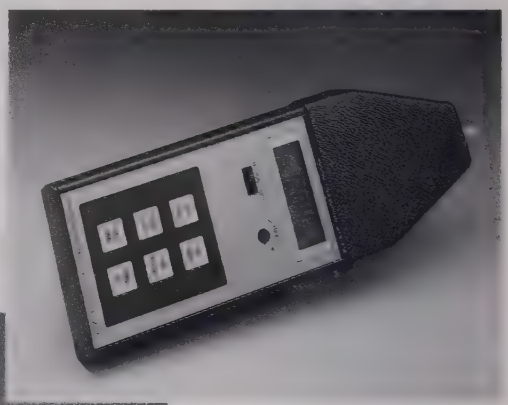
Specifications subject to change without notice

Sound Level Test Instruments

SMS-1

A complete sound measuring system with documentation capabilities, the SMS-1 gives you the information necessary to comply with all OSHA noise safety requirements. The SMS-1 is composed of several components designed to work together as one integrated system. The Model 893 functions both as a personal noise dosimeter and as an integrating sound level meter which meets ANSI Type S2A specifications. Used as a noise dosimeter, the 893 has a clip mounted microphone and gives readings of % dose, projected 8-hour average (based on timed short duration measurements), and elapsed time. A built-in security lock prevents unauthorized tampering with the selected measurement function. With its molded adapter, the 893 is transformed into a sound level meter capable of measuring continuous, intermittant, and impulsive noises from 80dBA to 130dBA. Threshold levels of 80, 85, or 90dBA are user selectable. Three modes: normal, maximum, and 60 second integrating can be chosen on the front panel membrane switches. In compliance with Walsh-Healy, an LED indicator is used to warn the operator when noises exceed 140dB. Connected via cables, the Model 894 and 895 Data Storage and Printer units give you an easy way to document noise readings and produce detailed noise profile histograms. Always necessary to ensure accurate sound level measurements, the Model 897 Calibrator makes it easy to adjust the 893 and keep it within specifications. The complete SMS-1 system includes Models 893, 894, 895, 897, all connecting cables, batteries, and a fitted storage/carrying case.

- ❑ MSHA Approved (893, 894, 887)
- ❑ Meets OSHA, Walsh-Healy, & ANSI Type S2A Requirements
- ❑ Complete Noise Measurement and Analysis System
- ❑ Sound Level Meter
- ❑ Personal Noise Dosimeter
- ❑ Data Storage and Printer
- ❑ Calibrator
- ❑ 4-Digit Readings, 80-130dBA
- ❑ Normal, Maximum, and Integrating Sound Level Modes
- ❑ Selectable 80/85/90dBA Threshold Levels
- ❑ Built-In Security Locks
- ❑ Includes Carrying Case



Specifications

Model 893 Dosimeter/Sound Level Meter

Dosimeter Mode

Threshold Level selectable, 80dBA, 85dBA, or 90dBA
Resolution 0.1% dose **Criterion Level** 90dBA
Accuracy meets ANSI S1.4 1971 (R1976) for type S2A instruments and ANSI S1.25
Frequency Weighting "A" weighting
Response Time "slow" **Exchange Rate** 5dB
Maximum Indication 999.9% dose

Sound Level Meter Mode

Dynamic Range 80-130dB per OSHA criteria
Accuracy meets ANSI specifications for type S2A instruments
Frequency Weighting "A" weighting
Response Time "slow" (1sec)
140dB Indication LED activated by sound levels in excess of 140dB
Calibration "instantaneous" with Model 887 calibrator

Elapsed Time Function

Range 00:00 to 99:59 (hours:minutes or minutes:seconds)
Application indicates time over which dose is accumulated

Microphone

Type 0.52" diameter, electret-condenser, omnidirectional, 70° angle of incidence

Display

Numerical 4-digit LCD
Annuciators "SPL", "SPL MAX", "INT 60", "LO BATT", "% DOSE", "dBA"

Power Requirements

Battery Type (1) 9V NEDA 1604A alkaline
Battery Life >60 hours for 8 hours per day operation
Low Battery Indication "LO BATT" when 8 hours of operation remain

Environmental

Operating Temperature -10° to 50°C
Storage Temperature -40° to 60°C (battery removed)
Temperature Coefficient ±0.03dB per °C (-10° to 25°C), ±0.05dB per °C (25° to 50°C) for reference measurement of 105dB at 1000Hz
Relative Humidity Influence <0.5dB (0-95% RH)
Magnetic Field Influence no effect in field of 1 oersted
Atmospheric Pressure Influence correction data supplied in Model 887 Calibrator manual

Physical

Case Construction anodized aluminum
Security Provision special tool provided to lock instrument in selected mode of operation
Dimensions 6.1"(H) x 3.1"(W) x 0.9"(D), (15 x 8 x 2cm)
Weight 14oz, (400g) with battery and microphone

Model 894 Storage Unit

Interfaces

Dosimeter Interface 3-wire cable with mating connectors (included)
Printer Interface flat 15-wire cable with mating connectors (included with Model 895 Printer)

Power Requirements

Battery Type (1) 9V NEDA 1604A alkaline
Battery Life >40 hours for 8 hours per day operation

Environmental

Operating Temperature 0° to 50°C
Storage Temperature -40° to 60°C (battery removed)
Relative Humidity 0-95%

Physical

Case Construction anodized aluminum
Security Provision special tool provided to lock instrument "OFF-DATA-PRINT" switch in selected location
Dimensions 6.1"(H) x 3.1"(W) x 0.9"(D), (15 x 8 x 2cm)
Weight 12oz, (340g) with battery

Model 895 Printer Unit

Printing

Method dot-line, non-impact thermal printhead
Character Format 5 x 7 dot matrix
Character Spacing 20 characters per line
Characters Printed all ASCII letters, numbers, and punctuation marks
Character Size 0.078"(H) x 0.051"(W)
Line Spacing 6.5 lines per inch **Number Of Columns** 20
Printing Rate 0.8 lines per second
Paper Advance automatic after printing each line
Paper thermal, 2.28" (5.8cm) wide, type TP 50 KM-A
Printout Color black characters on white paper
Printhead/Mechanism Life 500,000 lines (typical)

Interfacing

Storage Unit Interface flat 15-wire cable with connectors (included)

Power Requirements

Battery Type (4) NiCad, sub-C size, rechargeable
Battery Rating 1.48V, 1.2 amp-hour **Battery Life** 30hrs (nominal)
Recharge Time 12hrs (unit OFF), 16hrs (unit ON)
AC Line 120VAC using AC adapter/charger (included)

Environmental

Operating Temperature -10° to 50°C
Storage Temperature -20° to 60°C **Relative Humidity** 0-80%

Physical

Case Construction anodized aluminum
Dimensions 9"(H) x 3.3"(W) x 1.5"(D), (23 x 8 x 4cm)
Weight 1lb, (450g)

Model 887 Calibrator

Acoustic Output

Frequency 1000Hz ±1%
Sound Pressure Level 114dB ±0.5dB at reference conditions
Distortion <1% **Reference** 0dB = 0.0002µbar

Power Requirements

Battery Type (1) 9V NEDA 1604 **Battery Life** 35hrs approx.

Environmental

Operating Temperature 0° to 50°C
Output Temperature Coefficient < -0.05dB /°C
Relative Humidity 0-90%
Reference Conditions 23°C, 760mmHg, 30-50% relative humidity

Physical

Dimensions 5.25" long x 2" diameter, (13 x 5cm)
Weight 14oz, (400g) with battery

Specifications subject to change without notice

Sound Level Test Instruments

886, 884

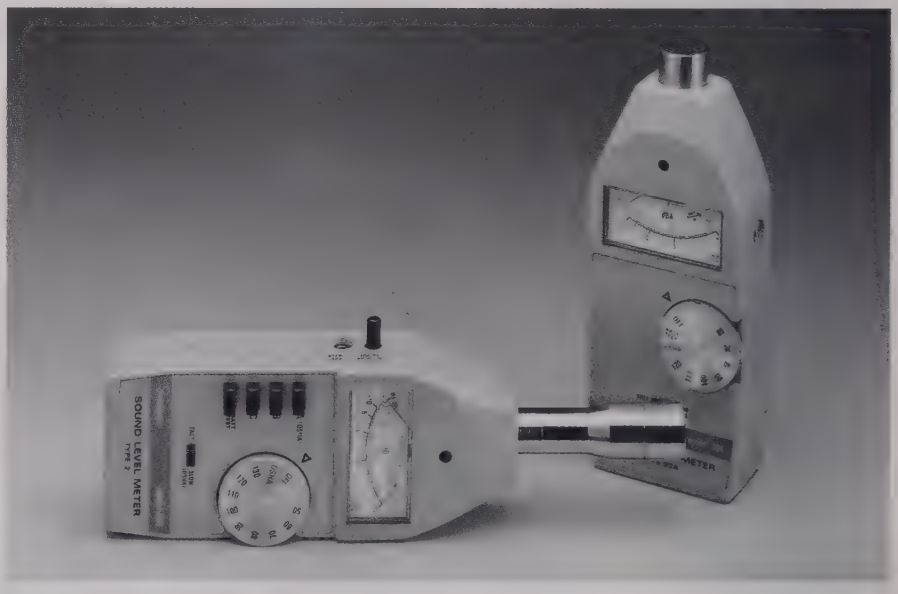
Noise surveys and inspections are a necessary safety precaution in any situation where potentially damaging sound pressure levels exist. The Models 886 and 884 Sound Level Meters fulfill the instrumentation requirements set by OSHA, Walsh-Healy, and the Mine Safety Health Administration and can help you quickly pinpoint problem areas. The 884 offers 7 basic measurement ranges from 50dBA to 130dBA with an extra range dedicated to the OSHA guidelines of 85-115dBA. The rugged, impact resistant case is shaped to prevent unwanted reflections which could produce inaccurate readings. A side mounted output connector allows an external recorder to be attached. The more advanced Model 886 has additional measurement ranges (40 to 140dB) and selectable frequency weighting (A, B, and C). An external filter jack allows you to connect the Simpson Model 898 Octave Band Analyzer and investigate specific frequency bands. The 886's microphone can be easily detached for remote use with the optional 25-ft. cable. Once your noise problems are identified you are well on the way to finding a solution.

Models 886 & 884

- ❑ Approved by MSHA
- ❑ Meets ANSI Type 2 Spec.
- ❑ Meets OSHA & Walsh-Healy Noise Control Requirements
- ❑ Large Dynamic Range
- ❑ Omnidirectional Microphone
- ❑ Fast or Slow Response
- ❑ Battery Operation
- ❑ Recorder Output
- ❑ Built-In Tripod Mount
- ❑ Includes External Output Plug and Batteries

Model 886

- ❑ Selectable Frequency Weighting (A, B, C)
- ❑ Filter Connections



Specifications

Model 886

Sound Level

Ranges 40-140dB **Reference** 0dB = 0.0002µbar
Accuracy meets ANSI S1.4 1971 (R1976) specifications for type 2 general purpose sound level meters and IEC 123 specifications
Weighting "A", "B", or "C"

Microphone

Type condenser type L size per ANSI S1.12 1967
Impedance 350Ω ±20% at 23°C
Characteristics omnidirectional, angle of incidence approximates random response equal to 70°

Signal Output

Level 1.2Vrms open-circuit for a full scale meter indication
Impedance 620Ω

Calibration screwdriver adjustable using Model 890 or 896 Calibrators

Power Requirements

Battery Type (2) 9V NEDA 1604 **Battery Life** 50hrs (approx.)

Physical

Dimensions 10"(H) x 3"(W) x 1.9"(D), (25 x 8 x 5cm) with microphone attached
Weight 1.3lbs, (0.6Kg)

Model 884

Sound Level

Ranges 50-130dB **Reference** 0dB = 0.0002µbar
Accuracy meets ANSI S1.4 1971(R1976) specifications for type S2A general purpose sound level meters
Weighting "A"

Microphone

Type condenser type L size per ANSI S1.12 1967
Impedance 350Ω ±20% at 23°C **Characteristics** omnidirectional

Signal Output

Level 1.2Vrms open-circuit for a full scale meter indication
Impedance 100Ω

Calibration screwdriver adjustable using Model 890 or 896 Calibrators

Power Requirements

Battery Type (2) 9V NEDA 1604 **Battery Life** 100hrs (approx.)

Physical

Dimensions 8.2"(H) x 3"(W) x 1.9"(D), (21 x 8 x 5cm)
Weight 14oz, (400g)

Specifications subject to change without notice

Sound Level Test Instruments

890, 896

Sound pressure level calibrators are essential accessories to be used with sound level meters and noise dosimeters. The 890 and 896 can be used to adjust Simpson Models 886, 884, and other sound level meters. The Model 890 provides a constant 114dB sound pressure level at 1KHz (0dB= 0.0002µbar). The Model 896 offers the versatility of additional output frequencies (125Hz, 250Hz, 500Hz, 1KHz, and 2KHz) along with an output level choice of 94dB or 114dB. The 896 is well suited for calibrating meters with multiple frequency weighting ranges (A, B, and C). Both calibrators are immune to a wide range of temperature and humidity conditions while maintaining tight output level tolerances.

Model 890
- ❑ MSHA Approved
- ❑ Calibrates at 114dB, 1000Hz
- ❑ Battery Test LED
- ❑ Includes Battery

Model 896
- ❑ Selectable Ouput Levels (94dB, 114dB)
- ❑ Selectable Output Frequencies (125Hz, 250Hz, 500Hz, 1KHz, 2KHz)
- ❑ Battery Test LED
- ❑ Includes Battery

Specifications

Model 890

Acoustic Output
Frequency 1000Hz ±1%
Sound Pressure Level 114dB ±0.5dB at reference conditions
Distortion <1%
Reference 0dB = 0.0002µbar

Power Requirements
Battery Type (1) 9V NEDA 1604
Battery Life 35hrs approx.

Environmental
Operating Temperature 0° to 50°C
Output Temperature Coefficient < -0.05dB/°C
Relative Humidity 0-90%
Reference Conditions 23°C, 760mmHg, 30-50% relative humidity

Physical
Construction aluminum housing
Dimensions 5.25" long x 2" diameter, (13 x 5cm)
Weight 14oz, (400g)

Model 896

Acoustic Output
Frequency 125Hz, 250Hz, 500Hz, 1000Hz, 2000Hz
Sound Pressure Level 114dB or 94dB
Accuracy
Frequency: ±2%
Sound Level: ±0.5dB at reference conditions
Distortion <5%
Reference 0dB = 0.0002µbar

Power Requirements
Battery Type (1) 9V NEDA 1604
Battery Life 120 hours approx. for 2 hours per day operation
Current Drain 3mA nominal

Environmental
Operating Temperature 0° to 50°C
Output Temperature Coefficient < -0.2dB/°C
Relative Humidity 0-90%
Reference Conditions 23°C, 760mmHg, 30-60% relative humidity

Physical
Construction aluminum housing
Dimensions 5.9" long x 2" diameter, (15 x 5cm)
Weight 15oz, (425g)

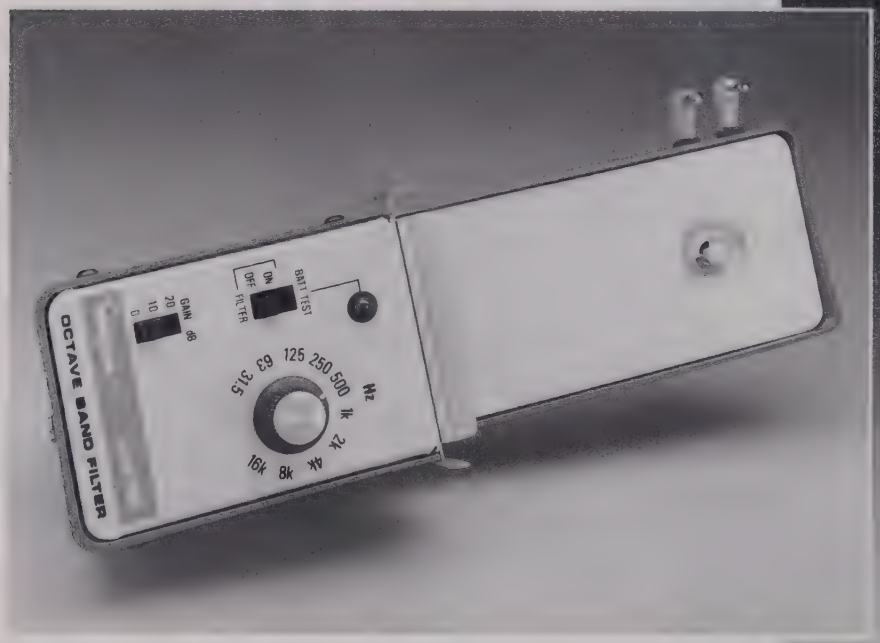
Specifications subject to change without notice

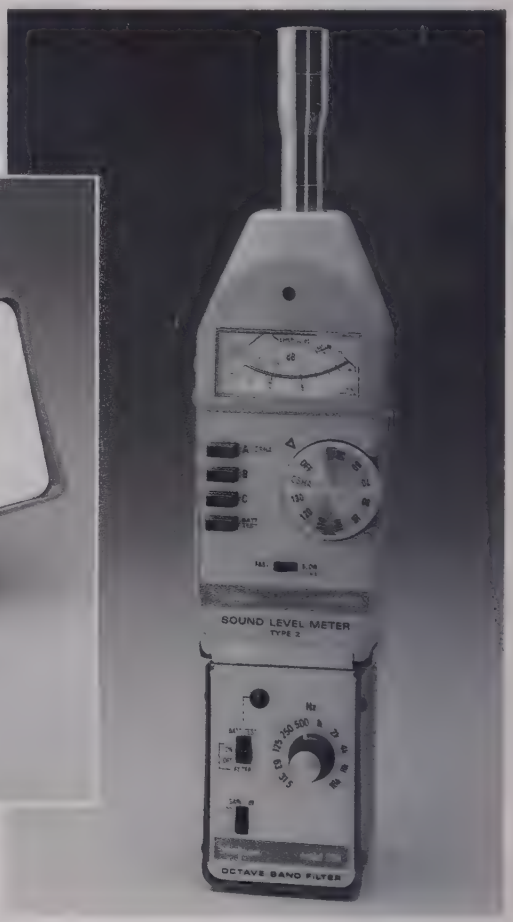
Sound Level Test Instruments

898

Isolation and analysis of specific noise sources may require investigations of narrow frequency bands and their relative contributions to the measured sound pressure level. The Model 898 Octave Band Filter, in conjunction with the Model 886 Sound Level Meter, provides active filtration over 10 selectable ranges from 31.5Hz to 16KHz. To keep the output signal level within the 886's measurement ranges, the 898's gain can be set to 0dB, +10dB, or +20dB. Filter transmission characteristics meet ANSI S1.11-1966 (R1976) Type E Class II filter set requirements. Simply switching the 898 off lets the signal bypass the filters and enter the sound level meter unaltered. Weighing only 11 ounces and operating on internal batteries, the 898 mounts directly to the 886 for handheld use or can be attached to a tripod for extended noise monitoring.

- ❑ Provides Detailed Noise Analysis
- ❑ 10 Selectable Center Frequencies
- ❑ Choice of 3 Gain Settings
- ❑ Attaches Directly to Model 886 Sound Level Meter
- ❑ Battery Operated





Specifications

Filter Characteristics

Center Frequencies 31.5Hz, 63Hz, 125Hz, 250Hz, 500Hz, 1KHz, 2KHz, 4KHz, 8KHz, 16KHz per ANSI S1.11-1966 (R1976), type E, class II
Rolloff -3dB at 0.707fm and 1.414fm points, -20dB down per octave from center frequencies (fm)
Ripple 1dB max. peak to valley
Insertion Loss ±0.5dB
Calibration externally adjustable
Gain 0dB, +10dB, +20dB (selectable)
Input Signal Level 240mVrms max.

Outputs

Sound Level Meter (Model 886) 1.2Vrms max. (20dB gain selection)
Output Impedance 600Ω (sound level meter output)
Recorder 1.2Vrms at full scale indication on the Model 886
Output Impedance 620Ω (recorder output)

Power Requirements

Battery Type (2) 9V NEDA 1604A
Battery Life 20hrs for 2hrs per day operation

Environmental

Operating Temperature -10° to 50°C
Storage Temperature -40° to 60°C (batteries removed)
Temperature Susceptibility <0.5dB over operating range
Relative Humidity 0-90%

Physical

Case Construction ABS plastic and anodized aluminum
Dimensions 8.6"(H) x 2.8"(W) x 2.4"(D), (22 x 7 x 6cm)
Weight 11oz, (310g)

Specifications subject to change without notice

Illumination Level Meter

408-2

Whether used to control industrial lighting levels or used as an experimental luminance meter, the Model 408-2 is both accurate and simple to operate. Four illumination ranges can be extended up to 50,000 foot candles by using the x100 filter. The large selenium photocell is set to match the spectral sensitivity of the human eye without the necessity of external filters. With the X2 adapter (included), the 408-2 can give direct readings of luminance up to 1000 cd/ft^2 A handy conversion table is printed on the back of the 408-2 to provide film exposure readings at ASA50 at f8. The 408-2 and its accessories come in a foam lined carrying case.

- ❑ Illumination and Luminance Readings
- ❑ Matches Eye Sensitivity
- ❑ Functions as Exposure Meter
- ❑ Four Ranges up to 50,000 Foot Candles
- ❑ Includes Remote Sensor, x100 Range Extension Filter, Luminance Measurement Tube, and Case

Specifications

Illumination

Ranges 15, 50, 150, 500 foot candles, (1.5K, 5K, 15K, 50K foot candles with slip-on x100 extension filter)
Accuracy ±5% of F.S., ±8% of F.S. with x100 filter, ±9% of F.S. with luminance tube
Light Sensitive Element 1.77" diameter selenium photocell corrected to eye response
Spectral Sensitivity matched to wavelength curve of eye
Cosine Correction up to 85° angle of incidence with built-in correction lens

Luminance (with slip-on x2 tube)

Ranges 30, 100, 300, 1K cd/ft^2
Tube Aperature 1.52" diameter
Test Area Diameter 1.7 x distance

Exposure Meter Table

For incident light measurements from 0.5-7.4K foot candles
Table ranges from 60sec to 1/250 sec at ASA50, 0-14EV, at f8.

Meter

Movement core magnet moving coil, unaffected by stray fields
Scale 3.125" (78mm) longest scale arc, 2.25" (56mm) shortest arc

Physical

Case Construction high-impact plastic
Dimensions 5"(H) x 3.6"(W) x 1.8"(D), (13 x 9 x 5cm)
Weight <1lb, (<0.5Kg)

Specifications subject to change without notice

Photo Tachometer

410

The Model 410 Photo Tachometer is perfect for measuring and setting rotation speeds on a wide variety of industrial machines. The 410 is easy to use since it does not contact the rotating parts in any way and can handle an extremely wide range of rotational speeds. Relying solely on optical detection of light/dark bands, the pick-up head can be up to 12 inches away from the moving surface. Many different materials, such as tape, chauk, and paint, can be used to create temporary or permanent contrasting bands which the 410 is able to sense. Battery operated and highly portable, the 410 comes with all necessary accessories in a foam lined carrying case.

- ❑ Optical RPM Measurement
- ❑ No Contact to Equipment
- ❑ Up to 50,000 RPM
- ❑ Portable
- ❑ Battery Operated
- ❑ Includes Related Accessories, Batteries, and Case

Specifications

Ranges 1.5K, 5K, 15K, 50K RPM
Accuracy ±2% full scale
Sensitivity Of Pick-up Head
0.2" to 2" (0.5-5cm): with light marking on dark background (or reverse) as provided by self-adhesive tape, chalk, paint, etc.
2" to 12" (5-30cm): with reflective marking on non-reflective background (or reverse) as provided by silver paint, fluorescent red paint, mirror tape, etc.
Input Resistance ≥10KΩ
Working Position horizontal
Meter Movement core magnet with spring-loaded pivot suspension
Operating Temperature 0° to 40°C

Power Requirements

Meter (1) 9V battery
Pick-up Head (2) 1.5V batteries

Physical

Case Construction high-impact plastic
Dimensions
Meter: 6"(H) x 3.6"(W) x 1.8"(D), (15 x 9 x 5cm)
Pick-up Head: 8"(H) x 1.9"(W) x 1.4"(D), (20 x 5 x 4cm)
Weight
Meter: approx. 0.9lb, (400g)
Pick-up Head: approx. 0.7lb, (300g)

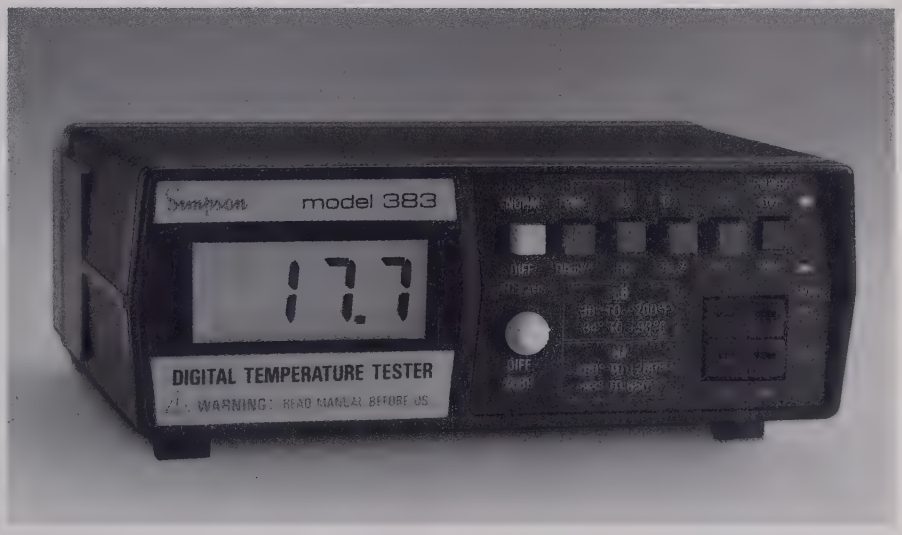
Specifications subject to change without notice

Temperature Test Instruments

383

Spanning the range from -30°F to 1200°F (-34°C to 650°C) the 383 is able to handle the vast majority of industrial and laboratory temperature measurement applications. An interesting aspect of the 383 is its ability to simultaneously measure temperatures at two locations and display the resulting data as separate measurements or as a relative temperature difference. The type J thermocouple probe is four feet long, enabling you to check remote points. The high contast, 3.5-digit LCD readout is switch selectable between °F and °C. An easy to use chart recorder output enables you to generate hard copy plots of your data. This output can also be used as a feedback signal in a simple thermal control system. Optional probes expand the uses of the 383 into relative humidity measurements and testing of self-cleaning ovens.

- ❑ Dedicated Temperature Tester
- ❑ -30° to 1200°F (-34° to 650°C)
- ❑ Dual Channels
- ❑ Type J Thermocouple Probe
- ❑ Normal and Differential Measurements
- ❑ Optional Probes for Humidity and Self-Cleaning Ovens
- ❑ Includes Test Leads, Type J Thermocouple Probe, and Batteries



Specifications

Temperature

Ranges -30° to 200°F, (-34° to 93°C); 200° to 1200°F, (93° to 650°C)
Accuracy (at ref. conditions) ±(0.2% of reading + 1.8°F) from 0°F through 1000°F; chart correctable from -30°F through 0°F and 1000°F through 1200°F
Resolution 0.1°F (-30° through 200°F), 1°F (200°F through 1200°F)
Temperature Probes type J thermocouple (iron-constantan), 4 ft. long
Max. Allowable Thermocouple Resistance 50Ω
Cold Junction Compensation automatic from 32°F through 122°F
Compensation Accuracy 0.1°F per 1°F ambient temperature change
Inputs two, switch selectable
Modes Of Operation NORM. (probe 1 or 2, switch selected), DIFF. (both probes used, probe 1 is reference; measures temperature difference between probe 1 and probe 2)

DC Voltage

Range 0 to 199.9mV
Accuracy ±(0.1% of reading + 1 count), 20° through 30°C
Input Resistance 10MΩ
Resolution 100µV
Display Polarity Indication "-" indicated, "+" implied
Conversion Rate 3 readings per second (nominal)

Recorder Output

Level 1mV per °F or °C (open circuit)
Min. Load Resistance 1KΩ recommended (accurate to 100Ω but with decreased battery life)
Accuracy same as meter accuracy (excluding recorder accuracy)

Relative Humidity (optional)

Uses wet/dry bulb temperature method. Kit includes thermocouple lead, relative humidity/dew point calculator, wicking material for wet bulb sensor, water dispensing bottle (and vial), and carrying pouch.

Isolation 40V (DC + AC_{peak}) max. voltage from any measuring or recording terminal to earth ground

Display 3.5-digit, 0.5" LCD with low battery indication

Power Requirements

Battery Type (1) 9V NEDA 1604A alkaline
Battery Life 100 hours

Environmental

Operating Temperature 41° to 104°F, (5° to 40°C)
Storage Temperature -40° to 140°F, (-40° to 60°C) without battery
Relative Humidity 95% max. (41° to 86°F, 5° to 40°C), 75% max. (86° to 104°F, 30° to 40°C)

Reference Conditions

Temperature 23°C (73°F) ±1°C
Relative Humidity 30 to 60%

Physical

Dimensions 2"(H) x 5.6"(W) x 4.6"(D), (5 x 14 x 12cm)
Weight 1lb, (450g)

Specifications subject to change without notice

Temperature Test Instruments

IR-10

Mechanical motion, electrical voltages, low thermal mass, and delicate construction can all prevent accurate temperature measurements using standard thermocouple probes. The IR-10 temperature probe avoids these problems by optically sensing infra-red light emitted by the object under test. Used with any VOM, DMM, or chart recorder, the IR-10 is able to produce readings from 0°F to 600°F (-18°C to 316°C) at distances of up to 10 inches (25 cm). Accuracies of ±1% can be achieved without regard to surface texture or relative motion. Built-in filters make the IR-10 insensitive to energy from sunlight and high intensity lighting. The IR-10's preset emissivity allows accurate readings to be taken from most non-metallic surfaces as well as painted, corroded, and heavily oxidized metals. Special stick-on disks are included for instant emissivity regulation of light colored surfaces.

- ❑ Non-Contact, Optical Temperature Probe
- ❑ Compatible with VOM's, DMM's, and Chart Recorders
- ❑ Unaffected by Surface Motion, Texture, or Voltage
- ❑ 0°F to 600°F (-18°C to 316°C)
- ❑ Distances to 10"
- ❑ Target Sizes down to 0.25"
- ❑ Includes Emissivity Disks, Test Lead Adapter, and Battery

Specifications

Temperature

Ranges 0° to 600°F or -18° to 316°C, switch selectable
Response Time 1 second
Resolution 1°F or 1°C (with DMM)
Accuracy ±1% of range through 500°F (40° to 110°F ambient), 1.5% of range through 600°F (chart correctable to ±1.0%)
Repeatability 0.5% of reading
Target Size 0.25" diameter from 0.25" to 0.75" distance, 3.16" diameter at 10" distance
Measurement Distance 0.25" to 10"
Emissivity preset to 0.95 (suitable for most non-metallic materials and surfaces plus painted, corroded, and heavily oxidized metals); stick-on 0.95% emissivity disks furnished for measurements of other objects
Field Of View approx. 3:1 (measurement distance vs. target size)
Probe Aperture
Cone Angle 18.9° (derived) at 0.75"
Focal Distance calibrated at 6" (focal distance can range from 4"-6")
Spectral Range 8-14 microns

Output

Level 1mV per °F or °C (open circuit)
Impedance 10Ω typical
Noise <1mV$_{p-p}$

Temperature Compensation

ambient & source compensation provided

Power Requirements

Battery Type (1) 9V NEDA 1604 alkaline
Battery Life 100 hours typ. (continuous), 6 months typ. (intermittant)

Environmental

Operating Temperature 0° to 50°C
Storage Temperature -30° to 60°C

Physical

Dimensions
Probe: 1.4" diameter x 5.4" long, (4 x 14cm)
Power Supply: 4.5"(H) x 2.5"(W) x 1.2"(D), (11 x 6 x 3cm)
Connecting Cord: 36" (uncoiled)
Weight 12oz, (340g)

Specifications subject to change without notice

Temperature Test Instruments

388-3L, 389-3L

Economically priced and ideally suited for field service and laboratory applications, the Models 388-3L and 389-3L Therm-O-Meters provide temperature measurement capabilities in the ranges most useful for heating and appliance service work. The popular 388-3L can handle any job in the range of -50°F to 1000°F (-45°C to 525°C). Three type J (iron-constantan) thermocouple probes can be attached to the 388-3L so that you can display the temperatures of three different locations with a simple switch selection. The dual-range Model 389-3L provides a detailed look at temperatures from -50°F to 250°F (-45°C to 120°C) at three separate locations. An extra-long probe lead (15 ft) gives you a generous stand-off distance. Optional probe leads are available for the 389-3L which extend your measurement distance up to 150 feet. Surface temperature and free air temperature probes are also available.

Models 388-3L & 389-3L

- ❑ Temperature Measurements at up to Three Locations
- ❑ 7 Inch, High Visibility Scales
- ❑ Temperature Ranges Optimized for Heating and Appliance Work

Model 388-3L

- ❑ Includes 8 ft. Probe and Battery
- ❑ Specialized Probes Available

Model 389-3L

- ❑ Specialized Probes and Extra-long Leads Available
- ❑ Includes 15 ft. Thermistor Lead

Specifications

Model 388-3L

Temperature

Range -50° to 1000°F, (-45° to 525°C)
Accuracy ±1.5 scale divisions

Physical

Dimensions 6"(H) x 8"(W) x 3"(D), (15 x 20 x 8cm)
Weight 3lbs, (1.4Kg)

Model 389-3L

Temperature

Ranges -50° to 100°F (-45° to 38°C) & 100° to 250°F (38° to 120°C)
Accuracy ±2°F center scale, ±3°F at other points

Physical

Dimensions 6"(H) x 8"(W) x 3"(D), (15 x 20 x 8cm)
Weight 4lbs, (1.8Kg)

Specifications subject to change without notice

Temperature Test Instruments

385-3L

Well suited to field service work by virtue of its small size and weight, the Model 385-3L is designed to provide accurate temperature measurements over the range of -50°F to 70°F (-45°C to 21°C). A total of three separate thermistor probes can be attached to allow switch selectable readings from three separate locations. Probe leads up to 150 feet long are optional as are surface temperature and free air temperature probes.

- ❑ Small Size
- ❑ Lightweight
- ❑ Switch Selectable Readings from Three Locations
- ❑ -50°F to 70°F (-44°C to 20°C)
- ❑ Optional Probes and Accessories
- ❑ Includes 15-Foot Lead and Thermistor

Specifications

Temperature

Range -50° to 70°F, (-44° to 20°C)
Accuracy ±1°F at center scale, ±2°F at scale ends

Physical

Dimensions 5.9"(H) x 3"(W) x 2.5"(D), (15 x 8 x 6cm)
Weight 1.5lbs, (680g)

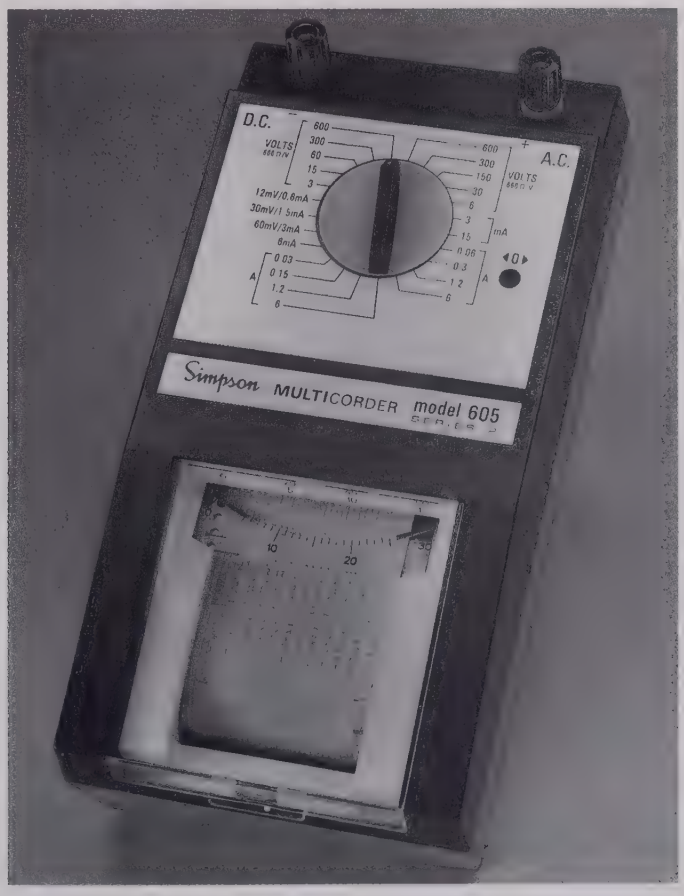
Specifications subject to change without notice.

Multi-Range Chart Recorder

605-2

Chart recorders provide the simplest means of generating hard copy documentation for experiment reports and files. The Model 605-2 Multicorder® incorporates plotting capabilities with the measurement versatility of a multimeter. A total of 27 ranges give you the possibility of recording many different levels of DC Voltage, AC Voltage, DC Current, and AC Current without elaborate signal conditioning. The inkless recording mechanism has 6 switch selectable plotting rates to handle a wide range of signal frequencies. Several specialized probes, designed specifically for the 605-2, are also available as options.

- ❑ Multiple Speed Chart Recorder
- ❑ Measures DC Voltage, AC Voltage, DC Current, and AC Current
- ❑ Inkless Recording Head
- ❑ Rugged Portable Construction
- ❑ Battery or AC Operation
- ❑ Includes Test Leads and Two Rolls of Chart Paper



Specifications

DC Ranges

Voltage 12mV, 30mV, 60mV, 3V, 15V, 60V, 300V, 600V
Current 600µA, 1.5mA, 3mA, 6mA, 30mA, 150mA, 1.2A, 6A

AC Ranges

Voltage 6V, 30V, 150V, 300V, 600V
Current 3mA, 15mA, 60mA, 300mA, 1.2A, 6A

General

Sensitivity 660Ω per volt (DC or AC voltage)
Accuracy
Recording: ±2.5% full scale
Indication: ±1.5% full scale
Chart Speeds 1, 3, 12 inches per hour, (2.5, 7.6, 30.5 cm per hour)
Impression Rate 1 or 2 sec selectable

Power Requirements

AC Line Version 120V, 60Hz
Battery Version (3) "AA" size batteries

Physical

Dimensions 10.6"(H) x 5"(W) x 3.8"(D), (27 x 13 x 10cm)
Weight 5.5lbs, (2.5Kg)

Specifications subject to change without notice

Insulation Test Instruments

405-2, 401, 400-2

High voltage, nondestructive insulation testing is important to verify compliance with safety standards. The Models 405-2, 401, and 400-2 insulation testers provide a wide range of test voltages and resistance scales to accurately determine insulation resistance of transformers, switches, and circuit assemblies. The 405-2 provides four test voltages up to a maximum of 5000VDC and resistance measurements to 20,000MΩ. Neon lights built into the display give highly visible indication of the selected range. A separate test range allows AC and DC voltage measurements up to a maximum of 1000V. The Model 401 can generates test voltages up to 1000V while measuring resistance values to 400MΩ. Like the 405-2, the 401 can also check AC/DC voltage levels up to 1000V. The economical Model 400-2 is designed to test relatively low insulation devices with moderate test voltages up to 500V. AC and DC voltages to 600V can also be measured. The 401 and 400-2 have push-button activated probes to conserve battery power, extend operation time, and allow one handed operation.

- ❑ Nondestructive High Voltage Insulation Testing
- ❑ Selectable Test Voltages
- ❑ Selectable Resistance Ranges
- ❑ AC and DC Voltage Measurements
- ❑ Push-To-Read Operation Extends Battery Life
- ❑ Includes Test Leads, Batteries, and Carrying Strap

Specifications

Model 405-2

Resistance

Test Voltage	Scale Multiplier	Ranges 0-500MΩ	40-2000MΩ	200-20000MΩ
500V	x 0.1	0-50MΩ	4-200MΩ	20-2000MΩ
1000V	x 0.2	0-100MΩ	8-400MΩ	40-4000MΩ
2500V	x 0.5	0-250MΩ	20-1000MΩ	100-10000MΩ
5000V	x 1	0-500MΩ	40-2000MΩ	200-20000MΩ

Accuracy ±1.5% full scale length (MΩ ranges), ±5% full scale to 1000V (AC/DC voltage ranges)

Power Requirements

Battery Type (6) 1.5V batteries

Physical

Dimensions 5.5"(H) x 9.6"(W) x 4.1"(D), (14 x 24 x 10cm)
Weight 4.8lbs, (2.2Kg)

Model 401

Resistance

Test Voltage	Scale Mult.	Probe Lamp Oper. Point	Ranges 0-400KΩ	100KΩ-5MΩ	2-200MΩ
100V	x 0.2	≥ 200KΩ	0-80KΩ	20KΩ-1MΩ	400KΩ-40MΩ
250V	x 0.5	≥ 500KΩ	0-200KΩ	50KΩ-2.5MΩ	1-100MΩ
500V	x 1	≥ 1MΩ	0-400KΩ	100KΩ-5MΩ	2-200MΩ
1000V	x 2	≥ 2MΩ	0-800KΩ	200KΩ-10MΩ	4-400MΩ

Accuracy ±1.5% full scale length (resistance ranges), ±1.5% full scale (voltage ranges)
Internal Resistance approx. 1KΩ

Continuity Testing

Range 100Ω-1KΩ **Open Circuit Voltage** approx. 5V DC

Power Requirements

Battery Type (6) 1.5V batteries
Battery Life approx. 5000 measurements on 1KV test voltage, approx. 9000 measurements on 500V test voltage

Physical

Dimensions 5.5"(H) x 9.6"(W) x 4.1"(D), (14 x 24 x 10cm)
Weight 4.9lbs, (2.2Kg)

Model 400-2

Resistance

	Ranges 0-400KΩ	100KΩ-5MΩ	2-200MΩ
Open Circuit Voltage	665V	665V	665V
Internal Resistance	250KΩ	150KΩ	150KΩ

Accuracy ±1.5% full scale length

Voltage

Range 0-600V AC/DC
Internal Resistance 263KΩ (AC), 292KΩ (DC)
Accuracy ±1.5% full scale

Continuity Testing

Range 0-4Ω
Open Circuit Voltage approx. 4.1V DC

Power Requirements

Battery Type (6) 1.5V batteries

Physical

Dimensions 4.6"(H) x 5.6"(W) x 3.2"(D), (12 x 14 x 8cm)
Weight 3.5lbs, (1.6Kg)

Specifications subject to change without notice.

High Voltage Tester

248

The model 248 High Voltage Tester provides an easy method to determine DC voltages in low power, high impedance circuits like those found in televisions and CRT displays. Everything is built into the hand-held probe with a spring hook included for "hands off" measurements. A thermoplastic probe body with oversized disk barriers provides superior insulation. DC voltages (negative ground) up to 40KV are indicated on the built-in taut-band meter movement with accuracies better than ±3%. Engineering and servicing of high voltage supplies and CRT circuitry can be made much easier by using the proper tool — the Model 248 HV Tester.

- ❑ High Voltage Indication to 40KV
- ❑ Fully Insulated Handle
- ❑ "Hands Off" Operation

Specifications

Voltage

Range up to 40KV DC, negative ground
Sensitivity 20KΩ per volt
Accuracy ±3%

Meter Movement

Type 50μA taut-band movement

Reference Temperature 23°C

Physical

Dimensions 14" (36cm) long

Clamp-On Test Instruments

HE-94, HE-95, HE-96

Using advanced Hall effect technology, the HE-94, HE-95, and HE-96 clamp-on ammeters make it easy to measure high currents without the necessity of shunts or dangerous "floating" measurements. Close the jaws over one conductor of your circuit to get an immediate reading up to 1000A (True RMS or True Average, depending on the model). Autoranging makes possible convenient single switch operation. Surge currents, like those produced during motor startup, are easily measured and held on the display. Each model includes two analog outputs so that both the instantaneous and True RMS (or True Average) measurements can be sent to chart recorders and displayed on oscilloscopes.

- ❑ AC/DC Current Readings Without Power Interruption
- ❑ Surge Current Values
- ❑ True RMS (HE-94 & HE-95)
- ❑ Up to 1000A (HE-95 & HE-96)
- ❑ Analog Oscilloscope and Chart Recorder Outputs

Specifications

Current

Ranges 200A, 1000A (HE-95 & HE-96); 20A, 100A (HE-94)
Resolution 0.1A (on 200A range of HE-95 & HE-96); 0.01A (on 20A range of HE-94)
AC Response true average (HE-96); true RMS (HE-94 & HE-95)
Crest Factor 6:1 for stated accuracy (HE-94 & HE-95), ACp must not exceed full range value
Accuracy ±1% of range
Range Selection autoranging
Frequency Range DC, 10Hz-1KHz
Overload Capability 1000%

Isolation

650VAC RMS or 900VDC ($V_{max.}$, circuit to earth gnd)

Instantaneous Surge Current

Hold Time indefinite (until released)
Accuracy ±2% of range
Response Time 100msec

Analog Outputs

Number 2 **Connector Type** 3-wire
Outputs proportional to instantaneous and true RMS (or true average) current values
Open Circuit Voltage 1mV per ampere (HE-95 & HE-96), 10mV per ampere (HE-94)

Analog Outputs (cont.)

Accuracy ±1% of range, ±2% offset
Source Impedance 50Ω **Max. Load** 1mA

Display

Numeric Display 3.5-digit, 0.625" LCD
Annunciators polarity, "AC", low battery
Hold Time normal readings are held for 10 seconds (typical)

Power Requirements

Battery Type (1) 9V NEDA 1604A alkaline
Battery Life 1 year (typical use), 30 hours (continuous use)

Environmental

Operating Temperature 0° to 50°C, (32° to 122°F)
Storage Temperature -40° to 50°C, (-40° to 122°F)
Temperature Coefficient ±0.2% per °C, (±0.1% per °F)
Relative Humidity 0-80%

Physical

Case Construction high-impact polycarbonate
Dimensions 10"(H) x 3.5"(W) x 2.8"(D), (25 x 9 x 7cm)
Jaw Opening (max. conductor size) 1.875" (48mm) diameter, or 0.875" x 2.25" (22 x 60mm) rectangular conductor
Weight 1.3lbs, (600g)

Specifications subject to change without notice

Clamp-On Test Instruments

296-2, 294-2, 295-2

Amp-Clamp® testers are designed to economically evaluate the performance of power circuits (motors, transformers, relays, etc.) without interruption or shutdown of equipment. All three models can measure AC currents to 300A RMS by simply clamping the jaws around one conductor in the circuit. A side mounted, thumb controlled knob accomplishes range selection. The finger-operated pointer lock makes it easy to work in confined areas by allowing measurements to be read after the tester is removed from the circuit. The 295-2 and 296-2 also include plug-in probes for AC voltage measurements to give you a complete picture of line conditions. A special resistance range in the 296-2 is tailored to investigations of motor windings, and other low resistance loads.

Models 296-2, 294-2, 295-2
- ❑ Current Measurements Without Power Interruption
- ❑ AC Current Readings to 300A RMS

Model 296-2 & 295-2
- ❑ AC Voltage Measurements to 600V RMS
- ❑ Includes Detachable Probes

Model 296-2
- ❑ Resistance Measurements to 500Ω

Specifications

AC Current
Ranges (RMS) 6A, 15A, 30A, 60A, 150A, 300A
Accuracy ±3% full scale for 60Hz sine wave with conductor centered
Temperature Error <1% full scale (15° to 35°C)

AC Voltage (Models 296-2 & 295-2)
Ranges (RMS) 30V, 150V, 300V, 600V
Accuracy ±3% full scale for 60Hz sine wave
Temperature Error 0.5% full scale (15° to 35°C)

Resistance (Model 296-2)
Range 500Ω
Center Scale 25Ω
Accuracy ±3% of arc
Isolation 600V RMS (850V_{peak}) max. circuit to earth ground voltage per ANSI C39.5 (April 1974)

Physical
Dimensions 10"(H) x 2.7"(W) x 1.4"(D), (25 x 7 x 4cm)
Weight 15oz. (420g)

Specifications subject to change without notice

Accessories

Clamp-On Current Probes

Amp-Clamp® current probes, used with analog VOM's or digital multimeters, provide accurate measurements of high AC and DC currents found in power systems and related control circuitry. The Amp-Clamp® jaws are closed over a conductor in the circuit and the current load is indicated on the connected meter. The Model 159 works with all digital multimeters and can handle currents from 100mA to 500A (AC or DC). The Models 153-2 and 154-2 are also designed for digital multimeters and have selectable ranges which reach 200A (AC). The primary difference between the 153-2 and the 154-2 is the type of test lead plugs (reverse insulated plugs on the 153-2, banana plugs on the 154-2). The 150-2 has six ranges (up to 300A AC) which are designed to be used in conjunction with analog VOM's.

- ❑ Current Measurements Without Power Interruption
- ❑ Clamp Over Conductor
- ❑ Connect to Digital Multimeters or Analog VOM's
- ❑ Measure up to 500A

Specifications

Model 159 (Catalog No. 12120)

Current

Compatibility digital multimeters
Measuring Range 0.1A to 500A (DC or AC)
Frequency Range DC to 440Hz
Output Level 1mV/A (DC or AC)
Min. Load Impedance 100Ω
Withstand Voltage 4000V (50Hz, 60Hz) for 1 minute between core and probe output
Max. Operating Voltage 660V RMS
Accuracy (at reference conditons)
DC or AC (0Hz to 65Hz)
- 0-10A: ±(2.5% of reading + 0.8A)
- 10-100A: ±(1.5% of reading + 1A)
- 100-500A (DC) or 100-450A (AC): ±2.5% of reading
- 450-500A (AC): ±6% of reading

Accuracy (cont.)
AC (65Hz to 440Hz)
- 0-10A: ±(4% of reading + 0.8A)
- 10-100A: ±(2% of reading + 1A)
- 100-450A: ±3% of reading
- 450-500A: ±7% of reading

Complex Waveform ±5%
Max. Crest Factor 5:1
Response Time 0.5msec maximum
Zero Adjustment Range ±5A typical
Influence of Conductor Position ±2.5% of reading from one end of the jaws to the other end

Power Requirement

Battery Type (2) 1.5V "AAA" alkaline, NEDA type MN2400
Battery Life 800 hours (average)

Model 159 (cont.)

Environmental

Operating Temperature 32°F to 122°F (0°C to 50°C)
Storage Temperature -4°F to 176°F (-20°C to 80°C)
Temperature Coefficient 500ppm (1A to 300A), 1000ppm (300A to 500A)

Physical

Dimensions 8.4" x 2.6" x 1.3", (21 x 7 x 3cm)
Weight 6.5oz, (180g)
Max. Jaw Opening 1.3", (3.3cm)
Max. Cable Dimension 1.182" diameter, (3cm)
Max. Bus Bar Dimensions 2.48" x 0.197", (63 x 5mm)
Lead Length 59", (1.5m)

Accuracy specifications are valid for the following reference conditions 20°C to 26°C (68°F to 79°F), conductor centered on jaw alignment marks, and output connected to 100KΩ/100pf load

Models	150-2	153-2	154-2
Catalog No.	00541 (banana) 00545 (reverse insulated)	12494	12495
Compatibility	analog VOM	DMM	
Ranges	5A, 10A, 25A, 50A, 100A, 250A (on 2.5VAC meter range) 6A, 12A, 30A, 60A, 120A, 300A (on 3VAC meter range)	2A, 20A, 200A (on 0.2VAC, 2VAC, or 20VAC meter range)	
Accuracy	±3% full scale	±3% full scale (20A & 200A ranges) ±4% full scale (200A range)	

Specifications subject to change without notice

Accessories

Cases

C. **HE-94, HE-95, & HE-96:** Deluxe case . . . 02232
K. **IR-10:** Soft Vinyl case 00822
B. **TS-111-3:** case 00719
150-2, 153-2, & 154-2: Utility Vinyl case 00548
160: Vinyl case 02225
Vacuum formed case 02929
Low cost, soft Vinyl case 02935
I. Strap-fitted, Vinyl case 02936
230-3: Leatherette covered case 00831
J. Leather case 04299
248: Carrying case 00804
G. **250:** Utility Vinyl case 00549
Ever-Redy Vinyl case 00805
D. Deluxe case 00812
Vinyl case 01818
Leather case 01871
G. **255:** Utility Vinyl case 00549
Ever-Redy Vinyl case 00805
D. Deluxe case 00812
Vinyl case 01818
G. **260-6XL Series:** Utility Vinyl case 00549
Ever-Redy Vinyl case 00805
D. Deluxe case 00812
Vinyl case 01818
Leather case 01871
E. **260-8 Series:** Roll-top case 00248
G. Utility Vinyl case 00549
Ever-Redy Vinyl case 00805
D. Deluxe case 00812
Vinyl case 01818
Leather case 01871
262-3: Ever-Redy Vinyl case 05262
G. **265:** Utility Vinyl case 00549
Ever-Redy Vinyl case 00805
D. Deluxe case 00812
Vinyl case 01818
269-3: Ever-Redy Vinyl case 05262
E. **270-5 Series:** Roll-top case 00248
G. Utility Vinyl case 00549
Ever-Redy Vinyl case 00805
D. Deluxe case 00812
Vinyl case 01818
Leather case 01871
294-2, 295-2, & 296-2: case 02224
G. **303-3XL:** Utility Vinyl case 00549
Ever-Redy Vinyl case 00805
D. Deluxe case 00812
Vinyl case 01818
A. **360-2:** Carrying case 00816
G. **360-3:** Utility Vinyl case 00549
Ever-Redy Vinyl case 00805
D. Deluxe case 00812
Vinyl case 01818
362-2: Leatherette covered case 00831
J. Vinyl case 04299
370: Leatherette covered case 00831
J. Vinyl case 04299
371: Leatherette covered case 00831
J. Vinyl case 04299
372-2: Leatherette covered case 00831
J. Vinyl case 04299

Cases (cont.)

373: Leatherette covered case 00831
J. Vinyl case 04299
374: Leatherette covered case 00831
J. Vinyl case 04299
375: Leatherette covered case 00831
J. Vinyl case 04299
376: Leatherette covered case 00831
J. Vinyl case 04299
377-2: Leatherette covered case 00831
J. Vinyl case 04299
379: Leatherette covered case 00831
J. Vinyl case 04299
F. **383:** case 00813
385-3L: Carrying case 08073
387: Leatherette covered case 00831
J. Vinyl case 04299
388-3L: Ever-Redy Vinyl case 05262
389-3L: Ever-Redy Vinyl case 05262
390-2: Leatherette covered case 00831
J. Vinyl case 04299
392: Leatherette covered case 00831
400-2: Vinyl case 01612
H. **401:** Vinyl case 01616
H. **405-2:** Vinyl case 01616
420A & 420D: case 01617
421, 422, & 423: Deluxe carrying case. . 00825
444: case 01617
460-6: case 01617
461-2: Carrying case with pouch 00814
461-2R: Carrying case with pouch 00814
462: Carrying case with pouch 00814
463: Carrying case 00813
464-4: case 01617
F. **467-E:** Carrying case 00813
F. **467-2:** Carrying case 00813
467-2T: Carrying case 00820
470: Deluxe strap case 00821
Vinyl pouch case 00822
474: Deluxe strap case 00821
Vinyl pouch case 00822
560: Deluxe carrying case 00825
605-2: Carrying case 02616
711: Carrying case 00814
712, 713, & 714: Deluxe carrying case . . 00825
8455: Carrying case 00824

Miscellaneous

Compatible with Models:
HE-94 HE-95 HE-96
Oscilloscope cable 02057
Chart recorder cable 02058
Compatible with Model:
SMS-1 (Model 895)
Thermal printer paper 20090
Compatible with Model 360-2
Battery set 00045
120VAC charger 12288
Compatible with Model 360-3
M. Battery set 00046
P. 120VAC charger 00743
Compatible with Model 380M
Styrofoam probe spacer 00781
Compatible with Model 420D
Battery set 00045
Compatible with Model 444
M. Battery set 00046
Compatible with Models:
461-2R 461-2 462
Battery set 00044
P. 120VAC charger 00743
Compatible with Model 605-2
L. 30-60-120 amp transformer 3% 02461
N. Chart paper 02614
Compatible with Model 886
O. Microphone assembly 00183

Accessories

Test Leads and Probes

Compatible with All Multimeters

Test leads with alligator clips 07500
Test leads with probe tips 07538
Two screw-on insulated alligator clips 00425
Standard 14-piece universal test lead system with vinyl pouch (components B, D, E, F, H, & I below) 05577

A. Deluxe 23-piece universal test lead system (components B through I listed below plus two large and two small spade lug adapters, two phone tip plugs, and a deluxe roll pouch) 00818
B. Two 48" test leads with insulated banana plugs 00421
C. Two 48" test leads with insulated banana plugs and elbow reverse jacks. . . . 00404
D. Two test lead extenders 00427
E. Two reverse banana jack to standard banana jack adapters 00426
F. Two 6" spring hook-on probes 00423
G. Two slip-on insulated alligator clips 00406
H. Two probe type test prods 00422
I. Two high density probes 00424

J. **Thermocouple Temperature Adapter**
Connects to any analog VOM or digital multimeter with banana jacks or reverse insulated input jacks. Capable of measuring a wide temperature range in °C or °F. A switch selects between the two thermocouple inputs. 00760

Specifications
Ranges -30°F to 1000°F, -34°C to 537°C
Output Level 1mV (DC) per °C or °F
Accuracy ±5°F or ±3°C
Isolation 30VAC, 60VDC (maximum circuit to ground voltage)
Power Requirement 9V alkaline battery, NEDA 1604A
Dimensions 1.4" x 3.4" x 2.2", (4 x 9 x 6cm)
Weight 0.35lb, (155g)

K. **Solid-State Temperature Probe Adapter**
Converts any analog VOM or digital multimeter into a direct reading temperature meter (25.1mV=25.1°). The electrically insulated probe lets you take temperature readings on "live" circuits. Test leads fit banana jacks or reverse insulated input jacks. 00758

Specifications
Ranges -50°C to 150°C, -58°F to 302°F
Output Level 1mV (DC) per °C or °F into 5000Ω (minimum)
Accuracy (at 15°C to 35°C ambient)
±2°C (probe tip temperature) from 0°C to 100°C, derated linearly to ±4°C from -50°C to 150°C
Response Time 4sec to within 2°C (50°C step input)
Isolation 350V_{peak} (probe tip to circuit common or earth ground)
Power Requirement 9V alkaline battery, NEDA 1604A
Specifications subject to change without notice

Test Leads and Probes (cont.)

Compatible with Models:

460-6	**464-4**	**467-2T**
467-2	**467-E**	**463**
461-2R	**461-2**	**462**
474	**470**	**360-3**

A. Model 153-2 AC Amp-Clamp® 12494
B. 5KV AC/DC probe 00053
C. 10A AC/DC shunt 00801
10A (100mV) AC/DC shunt 06716
100A (100mV) AC/DC shunt 06717
1000A (100mV) AC/DC shunt 06718
D. Test leads 00043
F. RF probe 00748
H. 40KV DC high voltage probe 00749

Compatible with Models:

260-8	**260-8P**	**260-8RT**
260-8PRT	**270-5**	**270-5RT**

D. Test Leads 00043
40KV DC probe 00411
10KV DC probe 00412
10KV AC probe 00413
Model 150-2 Amp-Clamp® 00545
5KV AC probe 00794
5KV DC probe 00795

Compatible with Models 488 & 487

Test Lead Set 48000

Compatible with Model 360-2

G. Test leads, banana plug input with probe tips or alligator clips 00125
Model 154-2 Amp-Clamp® 12495

Compatible with Models:

260-6XL	**260-6XLM**	**260-6XLP**
260-6XLMP	**255**	**250**

G. Test leads, banana plug input with probe tips or alligator clips 00125
Model 150-2 Amp-Clamp® 00541
5KV AC probe 00794
5KV DC probe 00795

Compatible with Model 303-3XL

Model 154-2 Amp-Clamp® 12495

Compatible with Models:

229-2	**269-3**	**262-3**

G. Test leads, banana plug input with probe tips or alligator clips 00125

Compatible with Model 265

G. Test leads, banana plug input with probe tips or alligator clips 00125
E. Flexible probe 00118
Model 150-2 Amp-Clamp® 00541

Accessories

Test Leads and Probes (cont.)

Compatible with Model 160

Test leads with alligator clips 01927
Test leads with probe tips 02055

Compatible with Model TS-111-3

G. Test leads 00236

Compatible with Micro-Tester Models:
230-3 372-2 379

B. Test leads with alligator clips 08375
Test leads with probe tips 08381

Compatible with Micro-Tester Models:
362-2 374 377-2
371 375 387
373 376

Test leads with alligator clips 08376
Test leads with probe tips 08379

Compatible with Model 1699

E. Kelvin test lead 00156

Compatible with Models:
389-3L 385-3L

15 ft. thermistor lead 00010
J. 30 ft. thermistor lead 00216
50 ft. thermistor lead 00415
Free air temperature probe 00789
D. Surface temperature probe 00790

Compatible with Model 388-3L

Surface temperature probe 00187
I. Thermocouple lead 00190
Thermocouple lead 00496

Compatible with Model 383

C. Test leads 00043
A. Thermocouple lead 00391

Compatible with Models:
401 400-2

H. Slip-on probe 00737

Compatible with Model 405-2

H. Slip-on probe 00737
Test lead 00828
Probe clip 00829

Compatible with Models:
296-2 294-2 295-2

F. Model 151-2 line-splitter 00544

Compatible with Models:
150-2 153-2 154-2

Test lead, adapts the Model 150-2 (banana plug version) and the Model 154-2 to fit reverse insulated input terminals, also used as replacement lead for Model 150-2 (reverse insulated plug version) 00529
Replacement test lead for Model 154-2 . . . 00533
F. Model 151-2 line-splitter 00544

Ordering Information

When ordering Simpson products please identify the catalog number for the model you have chosen. Note that some models have a choice of features. For your convenience, catalog numbers are listed in order of model number and also by product category.

By Model Number

Appliance Testing Package (Includes Model 255, Batteries, Test Leads, Thermocouple Lead, Line Splitter, Amp-Clamp, & Case) 12156
HE-94 With Analog Output Connector & Battery . . 12496
HE-95 With Analog Output Connector & Battery . . 12497
HE-96 With Analog Output Connector & Battery . . 12498
Industrial Testing Package (Includes Model 265, Batteries, Test Leads, Line Splitter, Amp-Clamp, & Case) . . 12185
IR-10 With Emissivity Disks, Test Lead Adapter, & Battery 00853
SMS-1 With Carrying Case (Comprised Of Models 887, 893, 894, 895, & Related Accessories - See Individual Model Descriptions) 12636
TS-111-3 With Battery, Test Leads, & Leather Case 12183
150-2 Compatible With Reverse Insulated Jacks . . 00545
150-2 Compatible With Banana Jacks 00541
153-2 12494
154-2 12495
159 12120
160 With Batteries & Test Leads 12271
229-2 With Battery & Test Leads 12267
230-3 With Battery & Test Leads 12142
248 00169
250 With Battery, Test Leads, & Alligator Clips 12158
255 With Batteries, Test Leads, Alligator Clips, & 5 Ft. Type J Thermocouple 12155
260-6XL With Batteries, Test Leads, & Alligator Clips 12205
260-6XLM With Mirrored Scale, Batteries, Test Leads, & Alligator Clips 12206
260-6XLP With Circuit Breaker Protection, Batteries, Test Leads & Alligator Clips 12207
260-6XLMP With Circuit Breakers, Mirrored Scale, Batteries, Test Leads, & Alligator Clips 12211
260-8 With Batteries, Test Leads, & Alligator Clips. . 12388
260-8P With Circuit Breaker Protection, Batteries, Test Leads, & Alligator Clips 12391
260-8RT With Roll-Top Case, Batteries, Test Leads, & Alligator Clips 12389
260-8PRT With Roll-Top Case, Circuit Breaker Protection, Batteries, Test Leads, & Alligator Clips 12392
262-3 With Batteries, Test Leads, & 4KV Probe Extension 12182
265 With Batteries, Test Leads, & Alligator Clips . . 12184
269-3 With Battery, Test Leads, & 4KV Probe 12192
270-5 With Batteries, Test Leads, & Alligator Clips. . 12226
270-5RT With Roll-Top Case, Batteries, Test Leads, & Alligator Clips 12227
294-2 (50Hz) 12117
294-2 (60Hz) 12491
295-2 (50Hz) With Test Leads 12118
295-2 (60Hz) With Test Leads 12492
296-2 (50Hz) With Leads, Battery, & Spare Fuse . . 12119
296-2 (60Hz) With Leads, Battery, & Spare Fuse . . 12493
303-3XL With 120VAC Charger, Battery, Test Leads, & Probe 12250
303-3XL With 230VAC Charger, Battery, Test Leads, & Probe 12251
313-3 With Battery & DC/AC/Ω Probe 12255
360-2 With 120VAC Charger, Test Leads, & Alligator Clips 12286
360-2 With 220VAC Charger, Test Leads, & Alligator Clips 12287
360-3 With 120VAC Charger, Batteries, Test Leads, & Alligator Clips 12282
360-3 With 220VAC Power, Batteries, Test Leads, & Alligator Clips 12284
362-2 With Test Leads & Battery 12281
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By Product Category

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560 With Rechargeable NiCad Batteries, Test Lead Kit, Line Cord, & Spare Fuse 56010
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560 With Rechargeable NiCad Batteries, Centronics Interface, Test Lead Kit, Line Cord, & Spare Fuse 56012
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379 With Test Leads 12380
387 With Test Leads 12440
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High Voltage Tester

248 00169

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